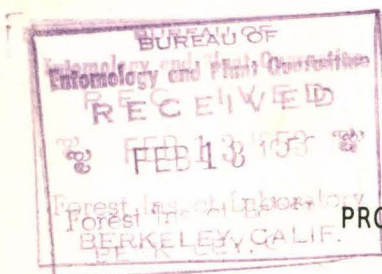
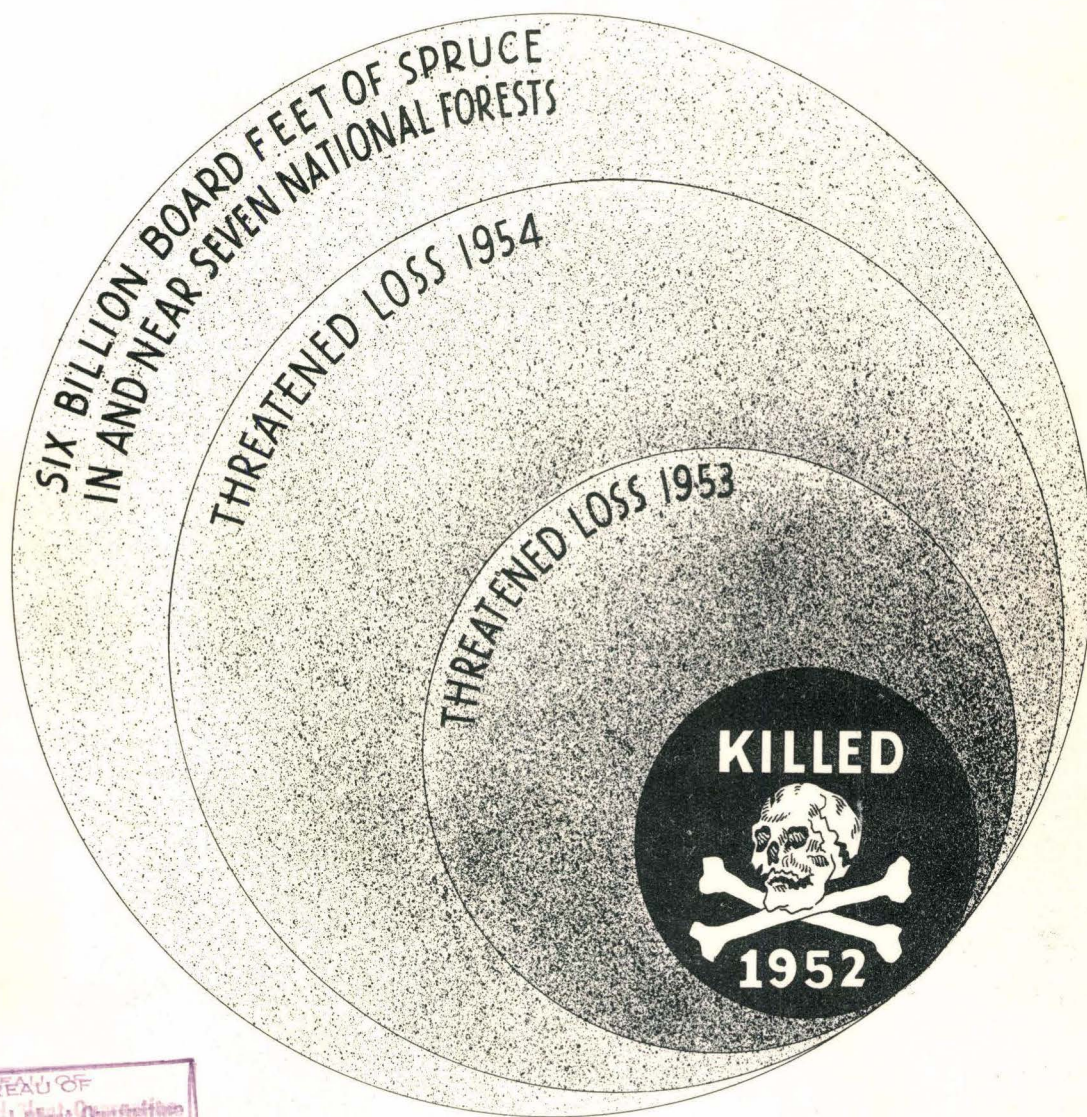


SPRUCE BARK BEETLE INFESTATION AND PLANS FOR ITS CONTROL

North Idaho and Western Montana

CBE *CB E*
RCH *RCH*
GRS *GRS*
MMF *MMF*
ADM *ADM*
RZC *RZC*
RES *RES*



PROGRESS REPORT OF TASK FORCE REPRESENTING —

TIMBER INDUSTRY

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, U.S. DEPT. OF AGRICULTURE

FOREST SERVICE, U.S. DEPT. OF AGRICULTURE

January 1953

SIX BILLION BOARD FEET OF SPRUCE
IN AND NEAR SEVEN NATIONAL FORESTS

GREEN SPRUCE

LOGGED FOR CONTROL & SALVAGE

KILLED BUT
NOT SALVAGED

*Estimated results by end of 1954, if proposed
plan of control is inaugurated.....*

SPRUCE BARK BEETLE INFESTATION
AND PLANS FOR ITS CONTROL
North Idaho and Western Montana
Missoula, Montana
January 1953

Progress report of task force composed of the following:

Hanley Morse - Representing Timber Industry

James C. Evenden - Representing the Bureau of Entomology
and Plant Quarantine

Reginald M. DeNio

Donald N. Matthews

David O. Scott

Paul A. Ingebo

George F. Weyermann

Ray L. Hilding

Corland L. James

- Representing the Forest Service

ERRATA

Page 6 - Table A, column four, last item, 315 instead of 365.

Page 21 - Last paragraph, end of second sentence, 1953 instead of 1952.

Page 23 - Last line, twofold in place of 100.

The map following Table II "Timber Access Roads, Cabinet National Forest" should show existing roads to the "epidemic spruce areas" in T. 47 N., R. 6 E., T. 46 N., R. 7 and 8 E., and T. 52 N., R. 10 E.

Table X does not show the estimated amount of green spruce to be saved by chemical control, but it is shown in the graph that follows the table.

Table XI, item 2, Sales Preparation, is limited to special, additional costs of selling infested and salvage spruce not covered by funds for ordinary sales.

ice.

oggers.

C. Chemical Control.

REGIONAL MAP.

VIII - RECOMMENDED PLAN OF ACTION.

Table VII Treatment of Infested Spruce Volumes.

Graph Based on Tables VII and IX.

A. PLAN FOR LOGGING FOR CONTROL AND SALVAGE.

F. S. Policy Governing Spruce Bark Beetle Control Roads.

F. S. Policy Governing Sales of Beetle Infested Spruce.

Spruce Emergency Roads

Table VIII Additional Forest Service and Operator Roads Required for Insect Control and Salvage.

Table IX Coordinated Plan - Logging for Control and Salvage.

Maps of Seven Forests Showing Roads and Spruce Areas.

B. CHEMICAL CONTROL.

Table X Chemical Control.

C. PLANS FOR SURVEYS, COMPARTMENT ANALYSIS, PROJECT TECHNICAL SERVICES, SALE PREPARATION AND OTHER ITEMS.

D. TABLE XI SUMMARY OF ESTIMATED NEEDS AND PROBABLE SOURCE OF MONEY TO FINANCE RECOMMENDED PROGRAM.

I. HISTORY - Events relating to epidemic of 1952.

November 26 and 27, 1949, wind velocities of from 60 to 100 miles per hour hit the northern part of Region One west of the Continental Divide. The Kootenai, Flathead and Yaniksu National Forests were the principal areas affected. Immediately it was known that a considerable amount of timber had been blown down. The season of the year and the inaccessibility of much of the area involved made it difficult to determine the extent of the damage. Nevertheless, steps were promptly taken to estimate the damage. A report was submitted to the Chief at the end of December. It included an estimate of the funds needed for roads and trails, timber management, and insect control as a result of the storm.

The 1949 storm was followed by a considerable blow-down in parts of the same general area again in April and May 1950. The Clearwater and St. Joe National Forests were hit hard by that storm.

The J. Neils Lumber Company began to salvage blow-down in November 1949. By June of 1950 they had salvaged 6 million feet (all species). Salvage operations were also under way on the Kootenai National Forest and other national forests. It is estimated that 17 million board feet of blow-down spruce were salvaged from national forest lands in 1951. Probably somewhat less was salvaged from other lands. The salvage of blow-down spruce continued through 1952, but by that time salvage of standing beetle infested trees attained large proportions.

A total of 61 million board feet of infested spruce was logged in 1952 up to November 15, (Table VI). About 47.5 million came from national forest lands, principally from the Kootenai, but also from the Kaniksu, St. Joe, Flathead and Cabinet Forests. About 13.5 million feet were logged from nonnational forest lands. It is estimated that the total amount of spruce logged from lands of all ownerships in 1952 may reach 125 million (log scale). This includes considerable blow-down in addition to the infested spruce. The total spruce lumber production from timber of all ownerships from all of Region One amounted to only 54.3 million (lumber tally) in 1950.

From the time the blow-downs were first reported the danger of insect infestations developing from them was recognized. There was a great deal of concern about this possibility because it was well known that various insect infestations have developed from blow-downs. Several species of timber and, therefore, several possible insects were involved. There was no way to forecast which might become the most important. Large amounts of white pine were down and it was closely watched for the development of beetle infestations. By November 1950, it was known that an infestation of the spruce bark beetle was building up in the spruce windfalls. No control was planned for 1951 because the infestation was spread over an excessive number of host trees. To have attempted to control it in the windfalls, it would have been necessary to treat many more trees to kill the same number of beetles as would be killed by treating one standing tree after it was attacked.

The development of the infestation in the spruce windfalls was closely followed in 1951. No indications that a major epidemic of the spruce bark beetle was impending were found.

In June 1952, heavy infestations were found in standing spruce trees, first on the Kootenai Forest and later on other forests. On July 1, 1952, a meeting was called at Libby, Montana, to discuss the spruce bark beetle infestation. Thirty-six were in attendance including men from industry, the States, the Bureau of Entomology and Plant Quarantine and the Forest Service. A trip was made to the woods to see the beetles at work. Plans were made to make detection surveys in all the important spruce areas over all of Region One, from the Custer to the Colville, on lands of all ownerships. Men to do the job were selected and trained. The first detection surveys got under way July 2, 1952. The entire region was covered as planned.

Meetings and training schools followed in rapid succession during July. Appraisal surveys got under way on the seven national forest areas where the detection surveys indicated the principal build-up of infestation was occurring. These areas include the Cabinet, Clearwater Flathead, Kaniksu, Kootenai, Lolo and St. Joe National Forests and adjacent and intermingled lands.

In the latter part of August a task force was organized under the supervision of Reginald DeNio, supervisor of the Colville National Forest, to make plans to cope with the infestation. It included the BEPQ and the Forest Service and industry was represented through the North Idaho and Montana forest insect committee of the Western Pine Association. By the first part of November 1952 over 500 compartments (topographic units, mostly 5,000 to 10,000 acres in size) containing the principal areas of infested spruce had been analyzed on the seven national forests. The need for access roads to facilitate control by logging was being analyzed.

Since the task force was organized, it has held several important meetings of representatives of industry, BEPQ and the Forest Service. On September 8 at one such meeting in Missoula with the insect committee (for northern Idaho and Montana) of the Western Pine Association in a closed session this committee recommended as follows:

1. That the task force should include other insects besides the spruce bark beetle in its program.
2. That the Boise and Payette Forests and adjacent territory in Region Four be included within the sphere of the task force.
3. That industry (through the Western Pine Association) be invited to participate and have a representative to take part in all top-level deliberations of the task force.

These suggestions were accepted and the Western Pine Association designated a representative on the task force. Ralph Hodges, their representative at Sacramento, California, served for a short time. He was followed by Hanley Morse, their representative at Coeur d'Alene, Idaho, who is the present member of the task force.

On October 31 there was another joint meeting at Missoula. A report entitled "Tentative Package Plan, Spruce Bark Beetle Control" (October 29, ditto) was presented and discussed. It covered the following subjects: Statement of the situation; summary of spruce compartment

data, objectives; need for insect surveys and investigations; logging for control and salvage; protection and expansion of the market for spruce; and direct control. The presentation was well received by the industry men and there was a great deal of constructive discussion. They recommended that a survey be made of the production and capacity of the loggers and sawmills of the region with special reference to future sales of spruce. This survey was made in cooperation with industry and the results are summarized in this report.

Spruce and entomological data and possible plans of action to cope with the epidemic were discussed with Messrs. Cliff, Mason and Dean at a Forest Service meeting in Missoula November 12, 1952. The same group discussed them with Messrs. Popham, Beal, Parker, Wygant, Evenden and other representatives of the BEPQ and a representative of industry November 13 and 14 at Missoula. About 35 people attended this meeting. Forest Service members of the task force met with Mr. Mason November 15 and 17 to analyze the possibilities for a spruce bark beetle program in 1953 with the emphasis on control by logging. Important entomological and administrative guides and policies were developed at these meetings for the first time for the use of the task force in analyzing and presenting a plan of action.

The November 26 report of the task force was completed and processed after the above meetings. On November 25, prior to the completion of the report, some of its contents were discussed with the insect committee of the Western Pine Association at Spokane by Messrs. Evenden, Lindh and DeNio. The industry representatives requested in particular the clarification of the national forest policy on the specifications of emergency spruce access roads.

The report of November 26 was sent to the chiefs of the Forest Service and the Bureau of Entomology and Plant Quarantine on that date. Mr. Lindh spent the week of December 1 to 5 in Washington developing the emergency spruce access road program presented in the January 1953 report. The report of January 1953 is essentially the same as the report of November 26 down to "VIII - Recommended Plan of Action." The December report presents the plan of action and policies developed after the November 26 report of the task force was submitted.

II. PRESENT STATUS OF INFESTATION

In all the mature stands of Engelmann spruce within the forests of Region One there are at all times normal infestations of the Engelmann spruce beetle. Losses from these low-level beetle populations vary from a small fraction to as much as .2 or .3 of a tree per acre, and for short periods fairly severe losses often occur. Such sporadic outbreaks are believed to develop from beetles breeding in windthrown or other down trees which are attacked in preference to standing green trees. Windthrown spruce remain in a condition favorable for attacks of this beetle during two seasons. As this type of host material has no resistance even a few beetles can make successful attacks and produce large broods. It is also apparent that these beetles are afforded some degree of protection from natural forces of control because they are under the snow and protected from weather and predators.

In 1950 the thousands of single and small groups of windfalls that were blown over in November 1949 and scattered over thousands of forest acres absorbed the normal spruce beetle population in all areas where they occurred. Surveys conducted in 1950 showed many of these trees to be lightly attacked with a few to as many as 50 or more individual spruce beetle attacks per tree. In comparison, the normal number of individual attacks in a standing tree will vary from 8 to 12 or more per square foot of bark surface. In 1951 a greatly increased beetle population emerged from the 1951 attacked material, and either reattacked the same or another windfall. These 1951 attacks resulted in a second build-up in the beetle population that emerged in 1952 in sufficient numbers to attack the many thousands of trees now infested. Variations in the severity of the infestation in different areas is perhaps explained in part by the presence or absence of windfalls.

Early in June hundreds of spruce trees with 1952 attacks of the Engelmann spruce beetle were found on the Kootenai National Forest. Following this discovery the personnel of the Kootenai Forest were instructed by personnel of the Bureau of Entomology and Plant Quarantine on methods of locating abnormal infestations of the spruce beetle. These examinations were surveys of discovery or "detection" surveys. These surveys called for counts of unattacked and attacked spruce trees along creek bottoms and heavily stocked areas of mature spruce, as the larger trees that occur in such areas are most susceptible to spruce beetle attack. The data obtained gave a percent of stand infested, which permitted the normal 1 or 2 percent infestation that is found in most all stands to be separated from abnormal situations. Most of the percentage figures obtained were understandably high, as detection surveys are directed to the most susceptible portions of each spruce area to determine if infestations are present.

Following the meeting with the Kootenai National Forest personnel on July 1, all public and private land managing agencies within the path of the 1949 windstorm were alerted to this threat to spruce timber stands. Some three weeks later representatives of these agencies met at Libby, Montana, to report the results of preliminary examinations. As a result of these reports the following plan of surveys was adopted. These surveys were to provide data that would portray the seriousness of the infestation throughout the region, and to aid in the sale of infested timber.

1. Detection surveys of all spruce areas within the entire region. These surveys were to be made by forest personnel.
2. Survey of sufficient intensity (reconnaissance) to provide data showing the status of the 1952 infestation by forest units. This work to be conducted by crews provided by the Bureau of Entomology and Plant Quarantine.
3. Appraisal surveys (2-1/2 percent coverage) to be made of areas where forest supervisors considered positive action by logging could be taken in 1 year. Caution was expressed in making selection of areas to be covered by these surveys to secure maximum benefits from available manpower. These surveys to be conducted by the Bureau of Entomology and Plant Quarantine with crews recruited from the forests involved.

Training schools were conducted by the Bureau of Entomology and Plant Quarantine as follows:

July 31. Libby, Montana.

Detection Surveys - Attendance at this school was as follows: Glacier Park Co., 2; Anaconda Copper Mining Co., 2; Northern Pacific Railway Co., 16; State of Idaho, 2; State of Montana, 2; Western Pine Association, 1; Forest Service, 37; Bureau of Entomology and Plant Quarantine, 5.

August 7 and 8. Troy, Montana.

Appraisal Surveys - Attendance included 16 Forest Service employees and representatives of the Diamond Match Company and the Pack River Lumber Company.

At later dates four additional schools were held for personnel of the Kaniksu, Cabinet and Lolo National Forests, and for the Potlatch Forests, Inc., and the State of Idaho.

The original program was carried through as planned. Exceptions being the additions of more forests, and of more areas within each forest. Reconnaissance surveys were designed to obtain an extensive sample of spruce stands not covered by appraisal surveys. They were of sufficient intensity and extent to provide a significant figure as to

status of the current infestation on each forest as a unit. In the following tables data are given for individual units where appraisal surveys were made. Reconnaissance data were applied to the volume of spruce not covered by appraisal surveys and the volume killed was divided by an average board foot volume per tree to obtain a figure of total trees killed.

Table A.

ENGELMANN SPRUCE BEETLE SURVEYS
CABINET NATIONAL FOREST
1952

Appraisal Survey

<u>Unit</u>	<u>Acres</u>	<u>Acres sample</u>	<u>Total trees</u>	<u>Infested trees</u>	<u>% in-fested</u>	<u>Infested trees per acre</u>	<u>Infested trees on unit</u>
North Fork,							
Little Joe	1,627	61.7	841	153	18.2	2.48	4,035
Trapper Cabin	821	46.4	768	31	4.0	.67	550
Rainy - Dominion	1,210	23.5	797	90	11.3	3.83	4,634
Big Creek	2,744	59.3	2,357	365 315	13.4	6.15	16,876
	6,402	190.9	--	--	13.7	4.08	26,095

Reconnaissance Survey

--	185	4,327	455	10.5	2.46	4,976
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Forest Summary

--	--	--	--	13.0	--	31,071
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Table B.

ENGELMANN SPRUCE BEETLE SURVEYS
FLATHEAD NATIONAL FOREST
1952

Appraisal Survey

<u>Unit</u>	<u>Acres</u>	<u>Acres sample</u>	<u>Total trees</u>	<u>Infested trees</u>	<u>% in-fested</u>	<u>Infested trees per acre</u>	<u>Infested trees on unit</u>
Martin Creek	1,400	33.00	813	28	3.4	.85	1,190
Sheppard Creek	1,400	16.00	563	29	5.1	1.81	2,534
Daggett Creek	200	1.00	7	0	.0	.00	0
Good Creek	40	1.00	51	13	25.5	13.00	520
Robertson Creek	600	12.50	318	20	6.3	1.60	960
Bowen Creek	1,200	30.25	766	14	1.8	.46	552
Griffin Creek	600	13.50	296	12	4.1	.89	534
Howsley Creek	700	19.10	853	100	11.7	5.23	3,661
S. Fk. Lost Cr.	1,200	33.50	713	15	2.1	.45	540
North Lost Creek	3,300	19.50	426	9	2.1	.46	1,518
Frenchy Creek	275	4.00	103	3	2.9	.75	206
Kraft Creek	700	10.50	457	3	.7	.28	196
Glacier Creek	1,000	31.70	735	28	3.8	.88	880
Red Butte Creek	600	12.00	324	11	3.4	.92	552
Shorty Creek	2,300	31.80	1,035	52	5.0	1.63	3,749
Upper Whale	2,600	43.00	1,126	21	1.9	.49	1,274
N. Fk. Coal Cr.	2,600	25.75	939	28	3.0	1.09	2,834
S. Fk. Coal Cr.	2,300	28.25	757	22	2.9	.78	1,794
Hallowatt Creek	5,400	56.50	1,334	61	4.6	1.08	5,832
Bond Creek	1,000	13.85	573	24	4.2	1.73	1,730
Fatty Creek	5,540	59.15	1,937	38	2.0	.64	3,546
Herrick Creek	480	6.00	279	2	.7	.33	158
Lion Creek	4,000	51.35	1,581	66	4.2	1.29	5,160
Yakinikak	3,820	--	--	--	2.0	.70	1,552
Tepee	2,731	--	--	--	4.4	1.20	3,270
	45,986	--	--	--	3.5	.97	44,742

Reconnaissance Survey

--	294.0	8,421	255	3.0	.87	115,328
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Forest Summary

--	--	--	--	3.1	--	160,070
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Table C.

ENGELMANN SPRUCE BEETLE SURVEYS
KANIKSU NATIONAL FOREST
1952

Appraisal Surveys

<u>Unit</u>	<u>Acres</u>	<u>Acres sample</u>	<u>Total trees</u>	<u>Infested trees</u>	<u>Percent infested</u>	<u>Infested trees per acre</u>	<u>Infested trees on unit</u>
Snow Creek	2,614	55.8	1,155	95	8.2	1.70	4,443
Pack River	1,344	31.8	833	74	8.9	2.30	3,118
Blue Joe	2,600	50.6	1,789	21	1.2	.42	1,092
Ojibway	724	24.3	361	34	9.4	1.40	1,013
Zion Creek	400	16.9	415	48	11.5	2.80	1,120
Quartz Creek	323	5.5	91	3	3.3	.54	174
Gordon Creek	170	6.6	79	5	6.3	.76	129
Moose Creek	480	11.7	110	0	0.0	0.00	0
Deer Creek	252	6.5	68	1	1.5	.15	38
Steep Creek	153	4.2	55	6	11.1	1.43	219
Porcupine Creek	355	11.9	211	60	28.4	5.04	1,775
Wellington Creek	1,387	27.3	369	16	4.3	.58	704
Rattle Creek	1,349	37.2	381	65	17.1	1.75	2,360
Myrtle Creek	2,350	117.2	2,202	83	3.8	1.41	3,320
Malcom Creek	2,415	--	--	--	5.8	.25	600
Upper Priest	1,915	--	--	--	10.0	.58	1,105
Upper Hughes	300	--	--	--	.7	.05	14
Little Snowy Top	1,920	--	--	--	8.0	.48	916
Rock Creek	2,323	--	--	--	6.0	.39	907
Lower Gold	515	--	--	--	.9	.07	37
Boulder Creek	2,160	--	--	--	2.1	.16	340
	26,049	--	--	--	3.5	.90	23,424
Reconnaissance Surveys							
	--	454	6,213	102	1.6	.22	27,101
Forest Summary							
	--	--	--	--	2.9	--	50,525

Table D.

ENGELMANN SPRUCE BEETLE SURVEYS
KOOTENAI NATIONAL FOREST
1952

Appraisal Survey

<u>Unit</u>	<u>Acres</u>	<u>Acres sample</u>	<u>Total trees</u>	<u>Infested trees</u>	<u>% in-fested</u>	<u>Infested trees per acre</u>	<u>Infested trees on unit</u>
Hawkins Creek	986	17.5	923	45	4.9	2.57	2,534
Jungle Creek	563	11.0	635	36	5.6	3.27	1,841
W.Fk.Yaak River	5,740	96.5	4,098	329	8.0	3.41	19,573
Garrer Creek	2,178	22.5	668	72	9.3	3.20	6,970
Pete Creek	1,590	37.0	961	53	5.5	1.43	2,274
Clark Mountain	1,500	37.5	920	327	35.4	8.72	13,080
Cool Clay-Burnt	460	11.5	283	93	32.7	8.09	3,721
Burnt Creek	490	9.5	226	102	45.1	10.74	5,263
S.Fk. Meadow	720	17.5	540	83	15.4	4.74	3,413
Lt.N.F.Big Cr.	1,156	62.5	2,006	276	13.6	4.42	5,110
Dodge Creek	500	18.0	715	71	9.9	3.94	1,970
Wigwam Creek	4,499	144.5	5,354	191	3.6	1.32	5,939
Weasel Creek	715	22.0	647	1	0.1	.05	36
Williams Creek	458	13.0	302	92	30.5	7.08	3,243
Clarence Creek	973	28.0	1,001	53	5.3	1.89	1,839
Kopsi Creek	218	6.5	120	15	12.4	2.31	503
Foundation Cr.	439	7.5	286	15	5.2	2.00	878
Edna Creek	1,145	34.0	1,030	12	0.3	.35	401
Fortine-Basin	1,106	27.0	718	18	2.5	.67	741
Sunday Creek	1,572	42.0	1,146	28	2.4	.67	1,053
Boulder Creek	835	27.0	792	70	8.8	2.59	2,163
Sutton Creek	805	21.0	1,015	51	5.1	2.43	1,956
Pinkham Creek	3,379	108.0	3,174	159	5.0	1.47	4,967
Young Creek	161	5.5	153	11	7.0	2.00	322
N.Fk.Meadow	943	19.5	396	66	16.6	3.40	3,206
Mule Creek	261	4.0	94	9	9.5	2.30	587
S. Fork Yaak	510	2.2	44	7	15.9	3.11	1,586
Caribou Creek	318	7.0	217	25	11.5	3.58	1,138
Spread Creek	3,850	--	--	--	26.8	5.59	21,507
Blacktail Creek	444	7.5	145	13	9.0	1.73	786
S.Fk.Meadow	609	3.5	89	10	11.2	2.80	1,705
	39,123	--	--	--	8.7	3.07	120,305
Reconnaissance Survey	--	238.0	5,145	301	5.8	1.26	87,761
Forest Summary	--	--	--	--	7.2	--	208,066

Table E.

ENGELMANN SPRUCE BEETLE SURVEYS
LOLO NATIONAL FOREST
1952

Appraisal Survey

<u>Unit</u>	<u>Acres</u>	<u>Acres sample</u>	<u>Total trees</u>	<u>Infested trees</u>	<u>% in- fested</u>	<u>Infested trees per acre</u>	<u>Infested trees on unit</u>
Squaw Creek	22	22.0	74	44	57.1	2.00	44
Papoose Creek	421	10.0	185	19	10.3	1.90	800
Brushy Fork	640	8.0	130	5	3.8	.62	397
Upper Grouse	159	7.2	49	15	30.6	2.08	331
Upper Placid	210	6.8	112	34	30.4	5.00	1,050
Buck Creek	18	2.4	10	1	10.0	.42	7
Sec.10,T16N,R16W	88	6.4	46	2	4.3	.31	27
Sec.2, T16N,R16W	9	1.6	8	--	--	--	--
Sec.14,T16N,R16W	6	.8	3	--	--	--	--
Sec.10,T18N,R16W	248	24.8	184	6	3.3	.24	59
Sec.14,T18N,R16W	70	6.8	53	0	--	--	--
Upper Trout	372	12.6	158	33	20.9	2.62	975
Cedar Creek	681	14.0	227	21	9.3	1.50	1,021
	2,944	123.4	--	--	11.5	1.60	4,711

Reconnaissance Survey

186	6,192	502	8.1	2.70	74,753
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Forest Summary

--	--	--	8.2	--	79,464
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Table F.

ENGELMANN SPRUCE BEETLE SURVEYS
ST. JOE NATIONAL FOREST 1/
1952

Appraisal Surveys

<u>Unit</u>	<u>Acres</u>	<u>Acres sample</u>	<u>Total trees</u>	<u>Infested trees</u>	<u>% in-fested</u>	<u>Infested trees per acre</u>	<u>Infested trees on unit</u>
Rocky Run	1,660	37.15	858	140	16.3	3.77	6,258
Bear Skull	310	7.25	190	28	14.7	3.86	1,197
Lt.N.Fk. Clw.R.	6,705	163.00	2,892	495	17.1	3.04	20,383
E.Fk.Fishhook	2,675	64.00	917	112	12.2	1.75	4,681
Alpine	3,166	73.60	1,339	152	11.4	2.07	6,554
Outlaw-Red Raven #3-A	170	5.40	39	9	23.1	1.67	284
Outlaw-Red Raven #3	175	3.75	77	10	13.0	2.67	467
Hilo-Bearskull	330	7.75	113	13	11.5	1.68	554
	330	7.00	187	29	15.5	4.14	1,366
Daveggio	1,920	45.25	976	297	30.4	6.29	12,077
Boulder	720	15.50	250	69	27.6	4.45	3,204
U. Sisters Basin	4,660	127.25	1,571	228	14.5	1.79	8,341
Malamute #78	250	6.25	70	37	52.9	5.92	1,480
Malamute #78-A	200	5.25	91	27	29.7	5.14	1,028
Adair Creek#201B	250	15.00	127	25	19.7	1.67	417
Adair Creek#201A	1,724	43.25	670	127	19.0	2.94	5,069
	25,245	626.65	--	--	17.3	2.90	73,360
Reconnaissance Survey <u>2/</u>							
	355.64	5,868	884	15.0	2.63	143,930	
Forest Summary							
	--	--	--	15.7	--	217,290	

1/ Surveyed by St. Joe Forest and Potlatch Forests, Inc., crews.

2/ Surveyed by St. Joe Forest crew.

Table G.

ENGELMANN SPRUCE BEETLE SURVEYS
REGIONAL SUMMARY
1952

<u>Forest</u>	<u>Percent of stems infested</u>	<u>Infested trees on forest</u>
Cabinet	13.0	31,071
Flathead	3.1	160,070
Kaniksu	2.9	50,525
Kootenai	7.2	208,066
Lolo	8.2	79,464
St. Joe	<u>15.7</u>	<u>217,290</u>
	6.0	746,486

Based on an estimate of 729 board feet per tree there are approximately 543.4 million board feet of infested spruce on the six forests. This loss is not entirely due to the epidemic. Even under endemic conditions about 1 percent of spruce stands are killed by the beetle. This would amount to about 51 million board feet per year. (One percent of the 5,132 million board feet of spruce on the six forests.) On this basis the 1952 spruce bark beetle epidemic by itself will kill about 492 million board feet of spruce on the six forests.

In completing the program of Engelmann spruce beetle surveys, valuable assistance was given to the Bureau of Entomology and Plant Quarantine by private land managing agencies and the Forestry Departments of Idaho and Montana. Some of these organizations provided survey crews for weeks of work on regular area assignments. Organizations contributing to this program were the Potlatch Forests, Inc., J. Neils Lumber Company, Northern Pacific Rwy. Company, Diamond Match Company, Pack River Lumber Company, and the forestry staff of the States of Idaho and Montana. This cooperation amounted to some 500 or more man-days, with an entailed expense of \$8,500. The assistance given by these agencies contributed materially to the completion of the survey task, and was greatly appreciated.

III. RESOURCE IN JEOPARDY

There are 12.4 billion board feet of spruce saw timber (Scribner rule) in all of Region One - northeast Washington, north Idaho and Montana. That is the total spruce resource we are dealing with. This includes the spruce on lands of all ownerships and trees that are available for commercial purposes and those that are not. (For example, it includes spruce of commercial quality in national parks and primitive and wilderness areas.) It does not include the small amount of spruce in the subalpine and in other types that are not considered to have timber of commercial quality. The 12.4 billion board feet of spruce above mentioned indicates the magnitude of the spruce resource that may be jeopardized by the spruce bark beetle infestation. On a comparable basis, it represents 10 percent of the total saw timber in the region.

Spruce is not the only timber in jeopardy. There is a possibility that after the spruce is killed the beetle may spread to other trees to some extent.

Spruce is widely distributed throughout the region. It occurs in eastern Montana, western Montana, north Idaho and northeast Washington. It occurs as a spruce type where it is in the majority and it is also widely disseminated in all other types. Although it is widely distributed, most of it occurs at the higher elevations. This explains why 78 percent of the 12.4 billion board feet is found on the national forest lands which tend to be the higher, more mountainous forest lands of the region.

Table I shows the acreage of the spruce type and the volume of saw timber on national forest lands by national forests. The same data for all other lands are recorded by counties and states in Table II.

Although spruce is widely distributed throughout the region, so far the spruce bark beetle infestation has seriously affected only seven national forests and the intermingled lands of other ownerships. The Kootenai and St. Joe Forests have the largest amount of infested spruce. The Flathead, Clearwater, Kaniksu, Lolo and Cabinet are the other forests affected.

Table I shows that the Lewis & Clark and Nezperce Forests each have almost a billion board feet of spruce. The Gallatin, Beaverhead and Bitterroot have considerable volumes of spruce.

TABLE I (Revised)

Summary
Spruce Data on National Forest Lands
By Forests

Forests	Status	Area of Spruce Type			Volume of Spruce M Bd. Ft. - Scribner			Other Types			Grand Total
		Saw-timber	Other	Total	Saw-timber	Other	Total	Saw-timber	Other	Total	
Cabinet	Non-Reserved	1,395	780	2,175	8,991	-	8,991	96,041	5,230	101,271	110,262
	Reserved	-	373	373	-	365	365	1,080	37	1,117	1,482
	Total	1,395	1,153	2,548	8,991	365	9,356	97,121	5,267	102,388	111,744
Clearwater	Non-Reserved	12,998	3,115	16,113	154,153	643	154,796	252,970	3,779	256,749	411,545
	Reserved	15,136	1,267	16,403	127,253	9	127,262	3,677	3,779	7,456	134,718
	Total	28,134	4,382	32,516	281,406	652	282,058	256,647	7,558	264,205	546,263
Flathead	Non-Reserved	128,386	17,644	146,030	1,033,587	5,290	1,038,877	379,571	2,774	382,345	1,421,222
	Reserved	25,369	3,244	28,613	187,379	2,578	189,957	69,700	489	70,189	260,146
	Total	153,755	20,888	174,643	1,220,966	7,868	1,228,834	449,271	3,263	452,534	1,681,368
Kaniksu	Non-Reserved	23,512	16,550	40,062	404,708	11,835	416,543	193,248	11,271	204,519	621,062
	Reserved	-	-	-	-	-	-	-	-	-	-
	Total	23,512	16,550	40,062	404,708	11,835	416,543	193,248	11,271	204,519	621,062
Kootenai	Non-Reserved	60,184	16,964	77,148	855,118	14,616	869,734	303,344	15,376	318,720	1,186,454
	Reserved	1,012	-	1,012	12,138	-	12,138	1,319	84	1,403	13,541
	Total	61,196	16,964	78,160	867,256	14,616	881,872	304,663	15,460	320,123	1,200,995
Lolo	Non-Reserved	42,906	2,813	45,719	412,412	1,071	413,483	149,010	5,244	154,254	567,737
	Reserved	27,813	7,651	35,464	204,662	11,334	215,996	38,004	10,662	48,666	264,662
	Total	70,719	10,464	81,183	617,074	12,405	629,479	187,014	15,906	202,920	832,399
St. Joe	Non-Reserved	29,085	8,650	37,735	458,427	6,930	465,357	211,351	6,705	218,056	683,413
	Reserved	-	-	-	-	-	-	-	-	-	-
	Total	29,085	8,650	37,735	458,427	6,930	465,357	211,351	6,705	218,056	683,413
Non-Reserved Reserved Sub-Total	Non-Reserved	318,466	66,516	384,982	3,327,396	40,385	3,367,781	1,585,535	50,379	1,635,914	5,003,695
	Reserved	69,330	12,535	81,865	531,432	14,286	545,718	113,780	128,831	242,611	788,329
	Total	387,796	79,051	466,847	3,858,828	54,671	3,913,499	1,699,315	179,210	1,878,525	5,792,024
Remaining Forests											
Bitterroot	Non-Reserved	4,156	-	4,156	17,342	-	17,342	8,247	3,143	11,390	28,732
	Reserved	28,864	3,216	32,080	205,979	1,827	207,806	39,293	41,544	80,837	288,643
	Total	33,020	3,216	36,236	223,321	1,827	225,148	47,540	44,687	92,227	317,375
Beaverhead	Non-Reserved	26,832	166	26,998	227,865	114	227,979	59,937	111,307	171,244	399,223
	Reserved	700	-	700	3,036	-	3,036	1,607	5,214	6,821	7,857
	Total	27,532	166	27,698	230,901	114	231,015	61,544	116,521	178,065	407,080
Coeur d'Alene	Non-Reserved	2,253	8,159	10,412	31,165	4,937	36,102	37,156	5,239	42,395	78,497
	Reserved	-	-	-	-	-	-	130	-	130	130
	Total	2,253	8,159	10,412	31,165	4,937	36,102	37,286	5,239	42,525	78,627
Colville	Non-Reserved	1,535	1,007	2,542	13,705	1,839	15,544	46,989	-	46,989	62,533
	Reserved	-	-	-	-	-	-	303	-	303	303
	Total	1,535	1,007	2,542	13,705	1,839	15,544	47,292	-	47,292	62,836
Custer	Non-Reserved	4,774	653	5,427	55,005	739	55,744	14,268	18,485	32,753	88,497
	Reserved	-	-	-	-	-	-	8,929	178	9,107	9,107
	Total	4,774	653	5,427	55,005	739	55,744	23,197	18,663	41,860	97,604
Deerlodge	Non-Reserved	6,681	6,445	13,126	36,183	3,280	39,463	25,728	32,185	57,913	97,376
	Reserved	613	246	859	2,153	174	2,327	545	427	972	3,299
	Total	7,294	6,691	13,985	38,336	3,454	41,790	26,273	32,612	58,885	100,675
Gallatin	Non-Reserved	45,327	3,851	49,178	467,244	5,576	472,820	188,166	59,418	247,584	720,404
	Reserved	16,100	200	16,300	116,071	179	116,250	11,964	4,464	16,428	132,678
	Total	61,427	4,051	65,478	583,315	5,755	589,070	200,130	63,882	264,012	853,082
Helena	Non-Reserved	5,744	176	5,920	74,781	109	74,890	65,003	24,397	89,400	164,290
	Reserved	-	-	-	-	-	-	89	9	98	98
	Total	5,744	176	5,920	74,781	109	74,890	65,092	24,406	89,498	164,388
Lewis & Clark	Non-Reserved	47,693	7,075	54,768	516,572	3,850	520,422	72,073	38,408	110,481	630,903
	Reserved	29,500	1,200	30,700	241,072	1,696	242,768	90,821	12,536	103,357	346,125
	Total	77,193	8,275	85,468	757,644	5,546	763,190	162,894	50,944	213,838	977,028
Nezperce	Non-Reserved	27,470	1,565	29,035	155,254	112	155,366	633,179	2,625	635,804	791,170
	Reserved	15,793	935	16,728	127,770	128	127,898	24,697	31,762	56,459	184,357
	Total	43,263	2,500	45,763	283,024	240	283,264	657,876	34,387	692,263	975,527
Non-Reserved Reserved Sub-Total	Non-Reserved	172,465	29,097	201,562	1,595,116	20,556	1,615,672	1,150,746	295,207	1,445,953	3,061,625
	Reserved	91,570	5,797	97,367	696,081	4,004	700,085	94,134	172,378	266,512	966,603
	Total	264,035	34,894	298,929	2,291,197	24,560	2,315,757	1,244,880	467,585	1,712,465	4,028,228
Regional Non-Reserved Regional Reserved Regional Total	Non-Reserved	490,931	95,613	586,544	4,922,512	60,941	4,983,453	2,756,281	345,586	3,081,867	8,065,320
	Reserved	160,900	18,332	179,232	1,227,513	18,290	1,245,803	292,158	107,185	401,343	1,647,146
	Total	651,831	113,945	765,776	6,150,025	79,231	6,229,256	3,048,439	452,771	3,483,210	9,712,466
Regional Total: National Forest & Other (Tables I and II)		832,837	148,002	980,839	7,626,646	100,530	7,727,176	4,166,646	520,759	4,687,405	12,414,581

Source: Forest Survey (Revised)

Compiled by: Tbr. Mgt. Date: 11/10/52

TABLE II (Revised)

Summary
Spruce Data on Lands Other Than National Forest
By Counties and States

State and County	Status	Area of Spruce Type			Volume of Spruce M. Bd. Ft. - Scribner						Grand Total
		Saw-timber	Other	Total	Spruce Type			Other Types			
					Saw-timber	Other	Total	Saw-timber	Other	Total	
Idaho											
Benewah	Non-Reserved	284	505	789	3,036	143	3,179	3,393	125	3,518	6,697
Bonner	Non-Reserved	2,375	1,380	3,755	41,116	729	41,845	90,146	2,590	92,736	134,581
Boundary	Non-Reserved	5,509	3,208	8,717	96,518	3,879	100,397	65,101	7,143	72,244	172,641
Clearwater	Non-Reserved	9,731	2,007	11,738	108,104	417	108,521	134,637	1,479	136,116	244,637
Kootenai	Non-Reserved	300	100	400	5,621	96	5,717	5,476	3,112	8,588	14,305
Idaho	Non-Reserved	14,615	220	14,835	155,284	5	155,289	84,075	252	84,327	239,616
Latah	Non-Reserved	260	200	460	3,911	9	3,920	28,929	2,402	31,331	35,251
Lewis	Non-Reserved	-	-	-	-	-	-	435	-	435	-
Nez Perce	Non-Reserved	-	-	-	-	-	-	1,186	-	1,186	-
Shoshone	Non-Reserved	6,794	1,418	8,212	166,030	914	166,944	126,764	2,232	128,996	295,940
Total	Non-Reserved	39,868	9,038	48,906	579,620	6,192	585,812	540,122	19,335	559,457	1,145,269
(No Reserved "Other" in North Idaho Counties)											
Montana (Western Counties)											
Deerlodge	Non-Reserved	56	120	176	219	3	222	56	174	230	452
Flathead	Non-Reserved	23,382	3,203	26,585	188,971	1,231	190,202	115,822	3,880	119,702	309,904
	Reserved	29,753	8,528	38,281	237,952	5,219	243,171	67,434	1,281	68,715	311,886
	Total	53,135	11,731	64,866	426,923	6,450	433,373	183,256	5,161	188,417	621,790
Granite	Non-Reserved	186	112	298	480	12	492	860	689	1,549	2,041
Lake	Non-Reserved	17,360	2,861	20,221	80,681	1,652	82,333	46,369	650	47,019	129,352
Lewis & Clark	Non-Reserved	998	47	1,045	4,656	8	4,664	696	468	1,164	5,828
Lincoln	Non-Reserved	1,947	1,053	3,000	14,770	855	15,625	38,154	3,274	41,428	57,053
Mineral	Non-Reserved	54	-	54	432	-	432	2,796	512	3,308	3,740
Missoula	Non-Reserved	27,300	1,921	29,221	143,117	914	144,031	68,356	2,093	70,449	214,480
	Reserved	2,911	173	3,084	21,633	-	21,633	444	-	444	22,047
	Total	30,211	2,094	32,305	164,750	914	165,664	68,770	2,093	70,863	236,527
Powell	Non-Reserved	740	272	1,012	3,322	111	3,433	10,477	1,770	12,247	15,680
	Reserved	1,719	-	1,719	13,886	-	13,886	795	11	806	14,692
	Total	2,459	272	2,731	17,208	111	17,319	11,272	1,781	13,053	30,372
Ravalli	Non-Reserved	229	-	229	815	-	815	3,380	355	3,735	4,950
Sanders	Non-Reserved	87	-	87	407	-	407	8,687	2,073	10,760	11,167
Silver Bow	Non-Reserved	-	49	49	-	37	37	17	124	141	178
Sub-Total	Non-Reserved	72,339	9,638	81,977	437,870	4,823	442,693	295,670	16,062	311,732	754,425
	Reserved	34,383	8,701	43,084	273,471	5,219	278,690	68,643	1,292	69,935	348,625
	Total	106,722	18,339	125,061	711,341	10,042	721,383	364,313	17,354	381,667	1,103,050
Montana (Eastern Counties)											
	Non-Reserved	10,331	259	10,590	101,043	142	101,185	55,477	19,128	74,605	175,790
	Reserved	23,500	4,600	28,100	78,971	4,062	82,633	139,286	7,589	146,875	229,508
	Total	33,831	4,859	38,690	179,614	4,204	183,818	194,763	26,717	221,480	405,298
Montana - Total	Non-Reserved	82,670	9,897	92,567	538,913	4,965	543,878	351,147	35,190	386,337	930,215
	Reserved	57,883	13,301	71,184	352,042	9,281	361,323	207,929	8,881	216,810	578,133
	Total	140,553	23,198	163,751	890,955	14,246	905,201	559,076	44,071	603,147	1,508,348
Washington	Non-Reserved	585	1,821	2,406	6,046	861	6,907	39,009	2,582	41,591	48,498
(No Reserved "Other" in Northeast Washington)											
Regional Total											
	Non-Reserved	123,123	20,756	143,879	1,124,579	12,018	1,136,597	930,278	57,107	987,385	2,123,982
	Reserved	57,883	13,301	71,184	352,042	9,281	361,323	207,929	8,881	216,810	578,133
	Total	181,006	34,057	215,063	1,476,621	21,299	1,497,920	1,138,207	65,988	1,204,195	2,702,115

SUMMARY OF SPRUCE VOLUMES BY STATES
(Million Bd. Ft. Based on Forest Survey)

States	Status	Ownership				Total
		National Forest	Other Owners			
			%	%		%
Idaho (R-1)	Non-Reserved	2,981		1,145	4,126	
	Reserved	849		-	849	
	Total	3,830	40	1,145	4,975	40
Montana (West)	Non-Reserved	2,940		754	3,694	
	Reserved	302		349	651	
	Total	3,242	33	1,103	4,345	35
Montana (East)	Non-Reserved	2,052		176	2,228	
	Reserved	496		229	725	
	Total	2,548	26	405	2,953	24
Montana (Total)	Non-Reserved	4,992		930	5,922	
	Reserved	798		578	1,376	
	Total	5,790	-	1,508	7,298	-
Washington (R-1)	Non-Reserved	92		49	141	
	Reserved	-		-	-	
	Total	92	1	49	141	1
Total	Non-Reserved	8,065		2,124	10,189	
	Reserved	1,647		578	2,225	
	Total	9,712	100	2,702	12,414	100
	Percent	78		22	100	

IV. COMPARTMENT ANALYSIS

For planning purposes, spruce and infestation data from all available sources of information have been compiled for over 500 compartments (topographic units, mostly 5,000 to 10,000 acres in size) on the seven national forests. These 500 compartments cover practically all stands on the seven forests that have over 5 percent of spruce.

File folders are being set up for each compartment in triplicate. One for the forest, one for the regional office and one for BEPQ. When complete, each compartment folder will contain a type map (mostly 2" per mile), summaries of uninfested and infested spruce, volume of other species as well as all related information. The results to November 7, 1952, of the compartment analysis are shown in Table III. This work is still under way. Considerable additional information is being compiled. When this work is completed for 1952, final summaries will be prepared supplementing this report.

These compartment records are the basic, localized information used in analyzing and planning access roads, direct control by spraying and control and salvage by logging as reported upon at this time. It is anticipated that they will continue to be a valuable aid in recording the future development of the infestation, in future planning and replanning and in the administration of control.

The surveys and estimates completed to November 7 show a total volume of 497 million board feet of beetle infested spruce on the national forest lands of the seven forests. They also show 91 million board feet of infested spruce on the lands of other ownerships inside the national forests. The total amount of infested spruce on other nonnational forest lands outside these national forests is not known.

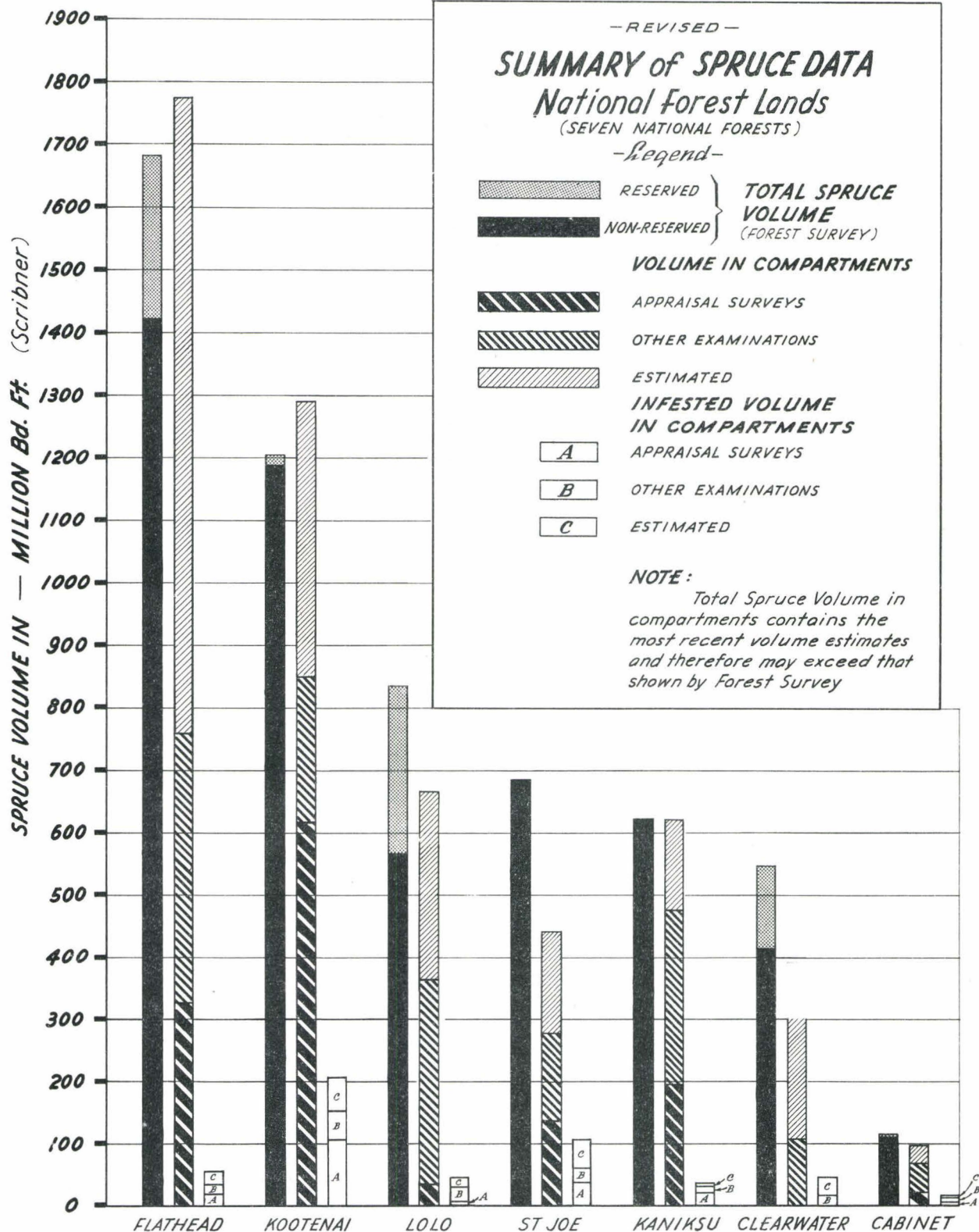
Table III contains the statistics of infested spruce by forests. The graph that follows Table III shows the total volume of spruce, the total volume covered by (1) appraisal surveys, (2) other examinations and (3) estimates on the national forest lands of each of the seven forests. It also shows the amount of infested spruce. The graph is based on Tables I and III.

App. Sur. - Appraisal Surveys
Oth. Exam. - Other Examinations
Est. - Estimates

TABLE III
Summary of Spruce Compartment Data
(Seven National Forests)

Compiled by: Tbr. Mgt., R-1
November 7, 1952

Forest	(Volumes in Thousand Board Feet - Scribner)																															
	National Forest														Other Owners																	
	Total Spruce Volume				Total Infested Volume				All Species						Total Spruce Volume				Total Infested Volume				All Species									
	Acres	App.Sur.	Oth.Exam.	Est.	Total	App.Sur.	Oth.Exam.	Est.	Total	Volume	Acres	App.Sur.	Oth.Exam.	Est.	Total	App.Sur.	Oth.Exam.	Est.	Total	Volume	Acres	App.Sur.	Oth.Exam.	Est.	Total	App.Sur.	Oth.Exam.	Est.	Total	Volume		
Cabinet																																
Non-Res.	37,206	20,130	47,887	29,572	97,589	4,553	6,033	3,527	14,113	350,977	-	-	-	-	-	-	-	-	-	-	37,206	20,130	47,887	29,572	97,589	4,553	6,033	3,527	14,113	350,977		
Reserved	2,000	-	-	1,000	1,000	-	-	20	20	4,000	-	-	-	-	-	-	-	-	-	-	2,000	-	-	1,000	1,000	-	-	20	20	4,000		
Total	39,206	20,130	47,887	30,572	98,589	4,553	6,033	3,547	14,133	354,977	-	-	-	-	-	-	-	-	-	-	39,206	20,130	47,887	30,572	98,589	4,553	6,033	3,547	14,133	354,977		
Clearwater																																
Non-Res.	135,799	-	91,457	136,136	227,593	-	11,598	17,698	29,296	1,877,017	14,064	-	23,287	25,717	49,004	-	3,028	3,343	6,371	252,030	149,863	-	114,744	161,853	276,597	-	14,626	21,041	35,667	2,129,047		
Reserved	14,790	-	15,944	73,889	89,833	-	2,073	9,606	11,679	161,498	-	-	-	-	-	-	-	-	-	-	14,790	-	15,944	73,889	89,833	-	2,073	9,606	11,679	161,498		
Total	150,589	-	107,401	210,025	317,426	-	13,671	27,304	40,975	2,038,515	14,064	-	23,287	25,717	49,004	-	3,028	3,343	6,371	252,030	164,653	-	130,688	235,742	366,430	-	16,699	30,647	47,346	2,290,545		
Flathead																																
Non-Res.	183,285	328,419	429,011	702,647	1,460,077	18,969	13,930	17,836	50,735	4,502,421	38,620	28,868	85,707	60,380	174,955	1,615	2,677	1,506	5,798	433,036	221,905	357,287	514,718	763,027	1,635,032	20,584	16,607	19,342	56,533	4,935,457		
Reserved	-	-	-	312,495	312,495	-	-	2,079	2,079	1,012,683	-	-	-	-	-	-	-	-	-	-	-	-	-	-	312,495	-	-	2,079	2,079	2,079	2,079	1,012,683
Total	-	328,419	429,011	1,015,142	1,772,572	18,969	13,930	19,915	52,814	5,515,104	38,620	28,868	85,707	60,380	174,955	1,615	2,677	1,506	5,798	433,036	-	357,287	514,718	1,075,522	1,947,527	20,584	16,607	21,421	58,612	5,948,140		
Kaniksu																																
Non-Res.	133,341	191,924	284,120	143,609	619,653	19,763	10,079	2,849	32,691	1,981,490	17,681	57,109	41,746	11,045	109,900	6,370	4,085	255	10,710	292,100	151,022	249,033	325,866	154,654	729,553	26,133	14,164	3,104	43,401	2,273,590		
Reserved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	133,341	191,924	284,120	143,609	619,653	19,763	10,079	2,849	32,691	1,981,490	17,681	57,109	41,746	11,045	109,900	6,370	4,085	255	10,710	292,100	151,022	249,033	325,866	154,654	729,553	26,133	14,164	3,104	43,401	2,273,590		
Kootenai																																
Non-Res.	205,962	613,118	236,746	427,944	1,277,808	106,180	44,979	52,808	203,967	2,570,007	10,264	-	-	31,711	31,711	-	-	2,795	2,795	138,141	216,226	613,118	236,746	459,655	1,309,519	106,180	44,979	55,603	206,762	2,708,148		
Reserved	2,000	-	-	12,600	12,600	-	-	252	252	50,000	-	-	-	-	-	-	-	-	-	-	2,000	-	-	-	12,600	-	-	252	252	252	50,000	
Total	207,962	613,118	236,746	440,544	1,290,408	106,180	44,979	53,060	204,219	2,620,007	10,264	-	-	31,711	31,711	-	-	2,795	2,795	138,141	218,226	613,118	236,746	472,255	1,322,119	106,180	44,979	55,855	207,014	2,758,148		
St. Joe																																
Non-Res.	98,665	136,304	141,690	159,646	437,640	34,929	24,578	47,179	106,686	1,618,680	71,325	87,785	15,629	122,914	226,328	21,254	2,817	29,171	53,242	2,040,737	169,990	224,089	157,319	282,560	663,968	56,183	27,395	76,350	159,928	3,659,417		
Reserved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	98,665	136,304	141,690	159,646	437,640	34,929	24,578	47,179	106,686	1,618,680	71,325	87,785	15,629	122,914	226,328	21,254	2,817	29,171	53,242	2,040,737	169,990	224,089	157,319	282,560	663,968	56,183	27,395	76,350	159,928	3,659,417		
Lolo																																
Non-Res.	126,328	31,756	329,283	61,433	422,472	4,939	24,802	3,546	33,287	1,624,808	73,680	-	175,535	29,477	205,012	-	10,304	1,497	11,801	750,664	200,008	31,756	504,818	90,910	627,484	4,939	35,106	5,043	45,088	2,375,472		
Reserved	55,000	-	-	242,700	242,700	-	-	12,135	12,135	400,000	-	-	-	-	-	-	-	-	-	-	55,000	-	-	-	242,700	-	-	-	-	-	400,000	
Total	181,328	31,756	329,283	304,133	665,172	4,939	24,802	15,681	45,422	2,024,808	73,680	-	175,535	29,477	205,012	-	10,304	1,497	11,801	750,664	255,008	31,756	504,818	333,610	870,184	4,939	35,106	17,178	57,223	2,775,472		
Grand Total																																
Non-Res.	920,586	1,321,651	1,560,194	1,660,987	4,542,832	189,333	135,999	145,443	470,775	14,525,400	225,634	173,762	341,904	281,244	796,910	29,239	22,911	38,567	90,717	3,906,708	1,146,220	1,495,413	1,902,098	1,942,231	5,339,742	218,572	158,910	184,010	561,492	18,432,108		
Reserved	-	-	15,944	612,684	658,628	-	2,073	24,092	26,165	1,628,181	-	-	-	-	-	-	-	-	-	-	-	-	-	-	642,684	-	-	2,073	24,092	26,165	1,628,181	
Total	-	1,321,651	1,576,138	2,303,671	5,201,460	189,333	138,072	169,535	496,940	16,153,581	225,634	173,762	341,904	281,244	796,910	29,239	22,911	38,567	90,717	3,906,708	-	1,495,413	1,918,042	2,584,915	5,998,370	218,572	160,983	208,102	587,657	20,060,289		



V. ECONOMIC JUSTIFICATION FOR ACTION

The probable results of three different courses of action will be compared:

- (1) Do nothing about the infestation (except, of course, salvage the small amount of spruce that can be removed with present roads, funds and markets.)
- (2) Direct control by spraying, use of trap trees or a combination of these methods.
- (3) Control by logging.

In order to keep these alternatives on a comparable basis 500 million board feet of infested spruce will be used throughout these comparisons. It is assumed that this infested spruce is scattered throughout a much greater amount of uninfested spruce.

Now to compare the three alternatives.

- (1) Do nothing.

Loss of 500 million of spruce stumpage @ \$8.00 per M	\$4,000,000
Add loss in stumpage value of remaining timber because of less volume to carry access road and other fixed costs. Estimated to amount to at least \$2.00 per M of spruce killed.	1,000,000
Total loss to U. S. Treasury	\$5,000,000

But this is only the beginning. Based on the calculated probabilities as we see them now, 500 million of infested spruce in 1952 left to itself may spread the infestation to two times as many trees in 1953 or that is to two times as much volume or, as in this example, to an additional billion board feet causing its loss at \$10.00 per M. \$10,000,000

And the spread of the infestation could continue until all the spruce within reach is killed. If it should kill 4 billion out of the 5,678 billion of spruce on the seven national forests the loss to the U. S. Treasury could be \$40,000,000

Additional losses may be sustained due to the following:

Rate of increase of the infestation may be greater than twofold.
Spread of uncontrolled infestation to other areas.
Increased fire hazard.
Increased sale and other administrative costs.
Loss of income to industries, labor and communities.
Reduction in national wealth.
Loss of residual trees after spruce is killed in mixed stands.

Reduction of the faith that people have in the forest as a dependable source of wood and income. No one will want to own timber or depend upon it for a livelihood if it is not going to be protected from insect infestations.

The magnitude of the losses that stem from killing and wasting 500 million feet of spruce can be shown as follows:

Add 18 percent to the 500 million to convert to lumber tally. Multiply by \$87 per M, the present average selling value of spruce lumber f.o.b. cars. The result is \$51,330,000.

(2) Direct control by spraying or a combination of spraying and trap trees.

Estimating that it will cost \$40.00 per M (\$30 per tree, including special roads, times 700 board feet per tree and rounded down to \$40) for direct control the cost of treating 500 million is \$20,000,000.

Even if we assume that use of trap trees and the most economical methods that can be developed will reduce the cost approximately one-third, it might still be roughly \$13,000,000

To which must be added the value of the 500 million of spruce stumpage which will not be salvaged by this method 5,000,000

Total cost plus loss to U. S. Treasury \$18,000,000

It is not likely that control can be applied promptly enough to stop any further spread of the infestation. Therefore the above \$18,000,000 represents minimum rather than probable costs and losses.

The major advantage of this course of action is that it should stop further losses of spruce.

A successful treatment of this kind should bolster the faith of the people in forestry as a dependable enterprise.

The major disadvantage is that most of the treated trees would be left to rot in the woods causing increased fire hazard; loss of income to industries, labor and communities; reduction in national wealth and other indirect losses.

There would be some gain from the roads put in to facilitate direct control, but for the most part the large expenditure would not improve accessibility.

(3) Control by logging. This course of action is assumed to include steps to protect and expand the market for spruce.

The money put into the access roads is not considered to be a cost against this method of control. The roads will be paid for out of the long-term stumpage returns from the spruce saved and the other timber made accessible.

The direct costs might be of two kinds:

- (a) Payments to loggers to remove spruce showing a negative stumpage value.
- (b) Cost of protecting and expanding the market for spruce in order to move the quantities required.

If we assume that these two costs together might average \$10 per M more than the income on the 500 million of spruce logged for control, the cost to the U. S. Treasury would be \$5,000,000.

If we can assume that each tree removed by logging will be just as effective in controlling the infestation as direct control by spraying or other means, then the \$5,000,000 direct cost for control by logging will buy an end result that is equivalent to that obtained by the \$20,000,000 cost of spraying or the \$13,000,000 cost of spraying and trap tree combination.

In addition to obtaining an equivalent amount of control at less cost, control by logging has these advantages that are not enjoyed by the other two alternatives:

First and very important, it would make use of the wood in the trees treated, thereby sustaining the long-term income of labor, industry, and communities.

It would also materially improve accessibility to the long-term advantage of the management of the forest and make it possible to utilize the full sustainable cut at a much earlier date than might otherwise be possible.

Recapitulation

Comparative costs of the three alternatives:

(1) Do nothing	\$40,000,000
(2) Direct control	18,000,000
(3) Control by logging	5,000,000

There are, of course, possibilities for combinations of these three alternatives that might be more economical and practical than any one by itself.

VI. OBJECTIVES

Guard and promote a full sustained production of spruce in order to ease the impact of the spruce bark beetle catastrophe on dependent forest industries, labor and communities by:

- (1) Preventing the beetle from killing more spruce by using the most economical means to accomplish this objective. Control the depredations of the beetle to endemic proportions.
- (2) Making the fullest practicable economical use of the spruce killed by the beetle by
 - (a) Improving the accessibility of the spruce.
 - (b) Protecting and expanding the market for spruce.

VII. POSSIBLE PLANS OF ACTION

A. Logging For Control and Salvage

The high cost of direct control, which may be as high as \$30 per tree, and the fact that it does not salvage the infested trees, are strong reasons for control by logging rather than by spraying. In order to use logging as a major method of control many miles of new or improved access roads must be built; and they must be built in time to remove the infested spruce at the right time while the beetles are still in the logs. Time is of the essence in using logging to take the beetles out of the woods in the logs before they do more damage. The greatest good can be accomplished by taking infested spruce out before July 1953. Nevertheless, even after that date removal of infested logs means the elimination of just that many beetles from attacking more spruce trees. Because the infestation may build up like a geometric progression the earlier the beetles are removed the greater the good that is accomplished. When the spruce trees are no longer infested and they are dead or dying it is still important to take them out as salvage and put them to use.

Funds for several purposes are essential to the success of logging for control and salvage. Protection and expansion of the market for spruce lumber is a major need and will be treated separately in the next section of this statement.

A fast-moving spruce access road program is essential if control by logging is to be extensively used in 1953 and 1954. Such a program will also contribute to the sustained yield management of all species in the areas made accessible. However, the paramount need is for speed in road construction so there will be roads at the right place at the right time.

The possibilities of improving existing roads or building new ones to open up areas of infested spruce have been analyzed area by area and road by road covering practically all of the known infestations in the seven forests. First consideration was given to the possibility of getting a main road built to the infested areas in time to do a material amount of good in the control of the infestation. Areas already roaded were included in the analysis in order to add their contribution to total amount of infested spruce that can be taken out for control by logging. Some roadless infested spruce areas were eliminated from present consideration for access roads and control by logging because there was too little infested or uninfested spruce compared to the road cost or because it might take too long to build a road to them or because of other reasons.

The analysis has been made in a manner that will make it possible to readily prepare any size of access road program for control by logging up to the maximum.

One of the major points in favor of direct control by logging is that the money spent on the roads will contribute to the sustained yield management of the areas in which they are built. Because of these long-term benefits it is not considered necessary to include the road costs as a cost of controlling the infestation. Their cost will be amortized by the timber sold over a long term of years after the infestation is controlled.

Arguments can be advanced for taking out only infested spruce. However, there are strong reasons for salvaging the dead or dying spruce even after its removal will not help to control the epidemic. Logging and sales administration costs would be increased very materially by taking out only the infested logs. This is a subject that will require a major decision involving the protection and expansion of the market for spruce and other matters.

B. Protection and Expansion of the Market for Spruce

The objective is clear and important. There are various means by which it might be accomplished. The Northeastern Timber Salvage Administration operated a corporation with money borrowed from the Disaster Loan Corporation when it salvaged the timber felled by the New England hurricane of 1938. Logs were purchased by the corporation and stored and many logs were milled and the lumber stored. About 700 million board feet were salvaged in this way and the market for logs and lumber was protected.

Ways and means are being explored here that will take logs (and possibly lumber too) temporarily off the market as soon as they can be taken out of the woods and store them for later release to the market. There are ample, well situated lakes for log storage. It is believed that logs can be stored at low cost and with a small loss of volume. Some financial arrangements may be needed for the storage of possibly several hundred million board feet of spruce in 1953 and probably even more in 1954. And that may not be all. It may be essential to hold the spruce until it can be absorbed by the market without depressing it.

Factual data should be obtained on the degrade or loss of volume sustained from the storage of spruce logs and lumber under different conditions. There is considerable difference of opinion on this subject at this time. Specific, localized information should be obtained as soon as possible on which to base future plans and operations.

Mill scale studies are needed to determine the overrun and grade recovery from spruce logs. There is also need to study the lumber and grade recovery from spruce that has been dead from insect damage for different periods of time. Industry has agreed that this is a field for cooperative effort with the public agencies.

There may be a need to set up machinery to purchase logs from loggers and hold them until they can be sold. It may be desirable to do the same for lumber. It is anticipated that their sale price will return most of what they will have cost. If a loss is incurred, it will be a small price to pay for (1) protecting the market for spruce in the interest of the dependent forest industries, labor and communities, (2) eliminating the beetles from spruce stands, and (3) salvaging spruce in order to put it to use for the benefit of the people of the entire country.

The possibility of price support for spruce lumber and logs through the Commodity Credit Corporation is now being explored by the Washington office of the Forest Service. In order to use the CCC it may be necessary to expand the law to cover logs and lumber.

This subject of the protection and expansion of the market for spruce has been studied by the task force from the time it was organized. It was discussed at some length at the meeting of the task force and their advisors from industry on October 30. The industry representatives suggested that the first step should be to make a survey of the present and potential logging capacity, milling capacity and labor supply in the Inland Empire. One part of this survey would be to determine industry's capacity to log, mill and market spruce lumber under the assumption that the market will be supported in some manner. It was the general opinion of the industry men that logging, milling and labor were more likely to limit the amount of spruce that can be logged than the market demand for spruce lumber.

The survey mentioned above was undertaken with the cooperation of the Western Pine Association. The results obtained to date are summarized in Tables IV and V.

CAPACITY AND PRODUCTION SUMMARY
OF SAWMILLS

Northeast Washington, Northern Idaho, and Western Montana

TABLE IV.

Name of Forest :	Production : 1951	Type : of Mill	Storage : Capacity	Would : Operator : Double Shift	Does Oper. : Operator : Double Shift	Availability : of : Labor	Production : Double : Shift	DK : No. of : Batt- : Series	Dry : Storage : MBM	Infested Spruce to be : Milled in 1953 by : Management	Volume of : to Maintain : Business	Volume : Operator : Can Finance : MBM									
	(MBM)	8 hr. shifts	Band: Cir.	Pond	Deck	Yes: No: *	Yes: No: *			A 1/	B 2/	C 3/									
Clearwater	206,600	1,396	5	0	62,100	24,800	5	1	3	1	Yearlong	246,200	125,400	28	31,000	18,000	6,000	13,000	33,200	-	
Nezperce	55,900	1,311½	5	0	4,850	36,000	4	1	3	2	Yearlong	72,600	43,600	20	25,250	15,000	54,000	59,000	65,000	15,000	
Total	262,500	2,707½	10	0	66,950	60,800	9	1	4	5	1	318,800	169,000	48	56,250	33,000	60,000	72,000	98,200	15,000	
Flathead	118,350	4,899½	3	26	43,970	78,700	27	2	2	23	4	90%Yrlg-10%SnL	316,700	160,350	10	68,500	59,230	127,750	187,500	71,250	162,850
Kootenai	112,600	1,598	2	8	10,500	35,100	7	2	1	7	1	" " " "	231,000	110,300	17	2,050	52,800	75,500	75,000	68,200	18,400
Total	230,950	6,497½	5	34	54,470	113,800	34	4	3	30	5	547,700	270,650	27	70,550	112,030	203,250	262,500	139,450	181,250	
Bitterroot	9,500	583	3		140	5,000	1	1	1	1	1	55%Yrlg-45%SnL	30,000	14,000	2	-	12,000	15,000	15,000	11,000	12,000
Cabinet	31,100	387	4		3,200	8,000	2	1	1	2		100% Yearlong	10,000	13,900	7	8,250	11,000	20,000	-	8,000	8,000
Lolo	152,400	-	2	4	3,500	12,000	6	1	2	1	6	100% Yearlong	153,700	88,900	27	22,000	21,500	37,000	57,000	139,000	143,500
Total	193,000	970	9	4	6,840	25,000	9	3	3	3	9	5	193,700	116,800	36	30,250	44,500	72,000	72,000	158,000	163,500
Coeur d'Alene	153,600	2,123	6	0	31,097	-	3	3	4	1	1	100% Yearlong	199,100	111,000	18	61,000	58,000	10,000	-	54,000	127,600
Colville (Spokane)	210,000	2,903	9	4	21,460	38,000	7	1	4	5	6	100% Yearlong	196,800	123,800	15	27,000	-	25,000	20,000	86,000	33,000
Kaniksu	178,780	4,524	9	13	43,995	61,510	21	1	7	15		80%Yrlg-20%SnL	232,950	124,380	24	118,650	44,100	58,600	88,500	17,475	168,790
St. Joe	40,550	1,597	1	10	5,180	15,850	7	2	2	1	10	75%Yrlg-25%SnL	70,000	40,550	-	18,000	250	22,400	31,300	26,050	24,000
Total	582,930	11,147	25	27	101,732	115,360	38	4	9	17	32	2	698,850	399,730	57	224,650	102,350	116,000	139,800	183,525	353,390
Grand Total	1,269,380	21,322	49	65	229,992	314,960	90	12	12	27	76	13	1,759,050	956,180	168	381,700	291,880	451,250	546,300	579,175	713,140

* - Made no commitments.

1/ Assuming all risks? _____ M ft.

2/ If government supports the market and price of spruce logs and stores logs surplus to current market? _____ M ft.

3/ If government supports the price of spruce lumber at levels permitting a fair margin of profit? _____ M ft.

* - Made no commitments.

1/ Assuming all risks? _____ M ft.

2/ If government supports the market and price of spruce logs and stores logs surplus to current market? _____ M ft.

3/ If government supports the price of spruce lumber at levels permitting a fair margin of profit? _____ M ft.

TABLE IV A

COMPARISON OF SAWMILL CAPACITIES AND SPRUCE PRODUCTION GOALS
FOR CONTROL AND SALVAGE BY ZONES

This table shows the possibilities for adjusting the milling
of spruce between zones.

December 31, 1952

Zone		Sawmill Capacity 1/ All Species	Planned Spruce Prod. 1953 2/			Planned Spruce Prod. 1954 2/		
No.	Name		Goal	Amt. Goal Exceeds Sawmill Capacity	Amt. Saw-mill Cap. Exceeds Goal	Goal	Amt. Goal Exceeds Sawmill Capacity	Amt. Saw-mill Cap. Exceeds Goal.
			MMBM	MMBM	MMBM	MMBM	MMBM	MMBM
1	Flathead	116	26	-	90	86	-	30
2	Kootenai	117	164	47	-	278	161	-
3	Missoula	164	47	-	117	61	-	103
4	Thompson Falls-St. Regis	27	27	-	-	None	-	27
5	Sandpoint-Bonniers Ferry	54	82	28	-	45	9	-
6	Newport-Priest River	124	1	-	123	None	-	124
7	Spokane-Colville	210	None	-	210	None	-	210
8	St. Joe-Coeur d'Alene	194	90	-	104	291	97	-
9	Clearwater	263	24	-	239	86	-	177
	Totals	1,269	461	-	-	847	-	-

- 1/ Based on actual sawmill production in 1951, therefore it does not represent maximum capacity. Some of these mills already operate two shifts and there are possibilities of expanding production by this means. The total capacity given here includes all of the larger mills, but it does not include all of the smaller mills.
- 2/ For spruce bark beetle control and salvage of killed spruce.

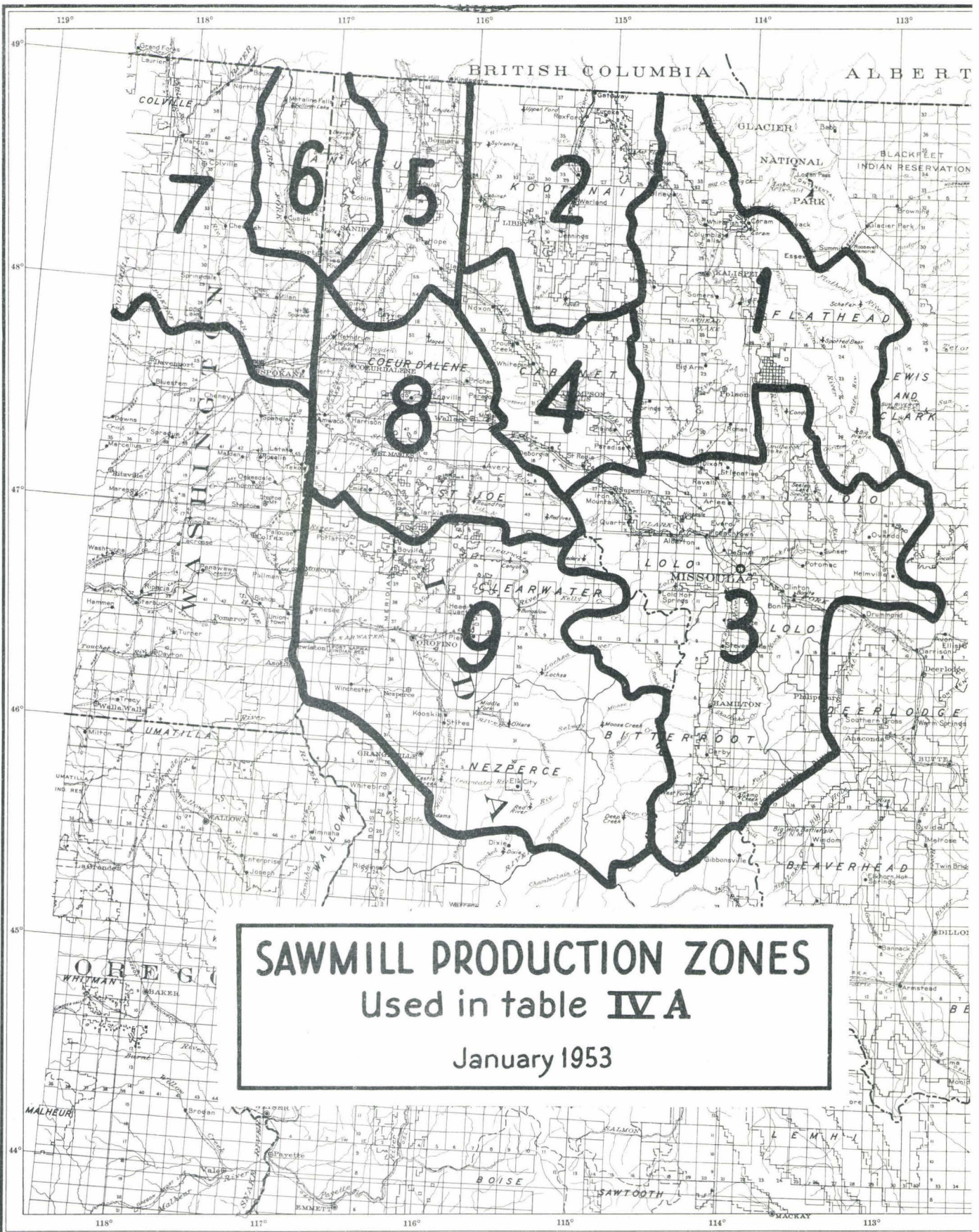


TABLE V.

SUMMARY OF CAPACITY AND PRODUCTION OF LOGGERS - REGION ONE

November 1952												
Forest	Logging Capacity Per Day (MBM)	Ave. Length of Logging Season	No. of Men		MBM of Spruce Logger Can Prod. 1953			No. of Men That Would Move To New Location	Possibility of Water Storage	Production Logger is Able to Finance	Production Expanded Daily To	
			In Crew	Using Camp	Without Assistance	If Access Constr.	If Log Prices Guaranteed				MBM	\$ per MBM
Clearwater	No report	9	84	12		10,000	25,000	30	Poor			
Nezperce	29											
Total	29	9	84	12		10,000	25,000	30				
Flathead	826	8	315	137	57,320	105,080	112,850	215	Fine	92,250	51,035	5.00-35.00
Kootenai	300	10	531	96	44,000	93,000	114,000	31	"	84,000	280	0.00-10.00
Total	1,626		846	233	101,320	198,080	226,850	246		176,250	51,315	
Bitterroot	No report	10	438	213	38,500	38,500	14,000	49	Fair	23,500	110	0.00-15.00
Cabinet	No report											
Lolo	865											
Total	865		438	213	38,500	38,500	14,000	49		23,500	110	
Coeur d'Alene	30	6	25	20					Lakes			
Colville	No report	6	212		57,812	66,312	37,632	130	Fair	53,312	945	1.00-10.00
Kaniksu	499											
St. Joe	1,240	8	371	251	59,000	84,400	68,900	98	Lakes	39,800	681	3.50-5.00
Total	1,769		608	271	116,812	150,712	106,532	228		93,112	1,626	
GRAND TOTAL	4,289		1,976	729	256,632	397,292	372,382	553		292,862	53,051	

Spruce Logged in 1952

It is estimated that 125 million board feet (log scale) have already been logged up to November 15, 1952, from all lands in Region One. Several million more will be logged by the end of the year. Over 61 million of infested spruce have been logged, 47-1/2 million of this came from the national forests, principally the Kootenai, Kaniksu, St. Joe and Flathead. Detailed information on the spruce logged in 1952 is shown in Table VI.

Table VI. Estimate of Spruce Logged in 1952 (to November 15)
(million board feet log scale)

Forests (and adjacent nonnational forest lands)	From national forest sales		From nonnational forest lands	
	Infested spruce (millions)	Total spruce (millions)	Infested spruce (millions)	Total spruce (millions)
Cabinet	0.5	1.2	--	--
Clearwater	--	.4	0.1	2.0
Flathead	1.0	12.5	0.3	10.0
Kaniksu	5.0	10.2	7.1	15.3
Kootenai	39.5	40.9	1.5	2.1
Lolo	--	0.4	0.2	3.9
St. Joe	1.5	4.9	4.5	12.0
Totals	47.5	70.5	13.7	45.3

Total infested spruce 61.2 million.

Total spruce, above seven forests 115.8 million.

It is estimated the spruce cut in the remainder of Region One will bring the total up to at least 125 million, and the cut for the entire year of 1952 will probably be somewhat over 125 million.

The relation of the figures in Table VI to some pertinent spruce statistics of other years is shown below:

Total spruce lumber production figures for Region One (industry total including spruce from all ownerships as collected every other year by the NRM Forest and Range Experiment Station) are as follows:

1950	54.3	million	board	feet	lumber	tally
1948	29.3	"	"	"	"	"
1946	17.5	"	"	"	"	"

Region One spruce sawlogs cut from national forest lands (S-STATISTICS-Cut by Species and Miscellaneous Products).

<u>Calendar years</u>	<u>Spruce sawlogs (millions)</u>	<u>Percent</u>	<u>Total sawlogs all species (millions)</u>
1951	<u>1/</u> 31.4	8	376.0
1950	16.4	6	281.0
1949	11.7	4	270.2

1/ Increase due to salvage of blow-down timber.

Total spruce lumber production in United States 1949 (lumber tally)

Engelmann	85.9	million	board	feet
Eastern	138.2	"	"	"
Sitka	<u>122.2</u>	"	"	"
Total	346.3	"	"	"

It is significant to the consideration of the need to protect and expand the market for spruce to mention that a large part of the spruce logged in 1952 will be held as logs over winter. Therefore, the lumber from these 1952 logs will add to the lumber to be marketed in 1953³. A study of the logging and sawmill capacities, Tables IV and V, along with the volumes of spruce that may be hauled over existing and proposed roads in 1953 leads to the conclusion that enough spruce logs may be produced in 1953 to have a serious effect upon the market for spruce lumber. On this basis it appears to be highly desirable to be ready to protect and expand the market in case the need arises.

There is an urgent need to make a thorough study of the markets for spruce lumber. Imports of spruce into the United States from Canada are apparently a considerable factor and should be investigated. Government purchase of lumber for military and other purposes should be looked into. There may be ways to increase the amount of spruce purchased. Steps should be taken to see that building codes permit the use of spruce consistent with its physical qualities. The Western Pine Association and the Forest Products Laboratory should be activated to help expand the market for spruce. Freight rates should be studied. The possibility of preferential rates for spruce lumber from infested trees should be determined. These are but a few of the many facets of the market for spruce that should be studied.

Industry has suggested that the Forest Products Laboratory could provide a valuable service by making readily available in one package all of the existing pertinent information about the properties and uses of spruce lumber.

C. Chemical Control

Direct or artificial control of Engelmann spruce beetle infestations must have as its objective the reduction of infestations to preserve residual timber values, or to prevent the spread of beetles into uninfested areas adjacent. Factors associated with infestation in many areas have required consideration of both objectives in determining values to be gained from direct control. In doing so there were questions for which answers were not available, but to plan this program it was necessary that some answers be assumed.

With infestations in nearly all spruce stands within each of the seven forests involved, there were but few instances where any advantage would be gained through attempts to prevent the spread of beetles from one area to an adjacent one. The importance of area to area flights is questioned. With no foundation for an answer to this question, it is not believed that the beetles will leave isolated areas of infestation until the host material within the area has been exhausted. However, the possibility of such flights has been recognized and considered.

Long distance flights of the beetle from one forest to another are a possibility, but they are not considered as too great a probability. Prediction of such occurrences is impossible to make as there are no situations on record that are comparable to the infestation now present within the region from which any worth-while conclusions could be drawn.

The possibility that an infestation unit of area can be recognized and used in planning direct control by logging or chemicals is being studied. Such units are areas where there is a reasonable degree of assurance that the benefits of control will not be destroyed by

migrations of beetles from adjacent uncontrolled infestations. It is probable that if such units exist they will vary in size depending upon such factors as topographic barriers, severity of the infestation and stocking and continuity of the spruce host type.

There is a recognized need for a statement about the behavior of the spruce bark beetle in this region for general distribution. In addition to entomological information this statement should discuss the more important assumptions about its behavior that have been made in planning for its control.

In considering the safeguarding of residual timber values through an application of direct control, assumptions concerning the behavior of spruce beetle infestations have been adopted and used until better data are available. These assumptions were based upon a careful consideration of all phases of the problem. Experience was drawn upon for an evaluation of natural forces of control, as well as other factors that could contribute to an additional brood mortality. It is recognized that in specific instances these assumptions may be apart from what actually occurs, but for general application they are believed to be well within bounds.

As this is the first year of the severe spruce beetle outbreak now present within the forests of Region One, an increase in its severity is expected to occur in 1953, and again in 1954. At the end of that period it is expected that natural forces of control will have established their supremacy over the abnormal beetle population and that there will be a marked reduction in the severity of the outbreak in 1955. It is assumed that abnormal 1952 infestations of the spruce beetle, in areas where no direct control or logging for control is conducted, will increase 100 percent in 1953; that the 1953 infestation will double again in 1954, but in 1955 these increased beetle populations will be reduced by some 75 percent by natural factors of control that have developed within the area. For example, the accumulated loss of spruce volume in an area of 10 percent - 1952 infestation would by 1955 be 80 percent of the total volume. The yearly progress of this loss is shown in the following formula:

$$\frac{1952}{10\%} + (2 \times 10\%) \frac{1953}{20\%} + (2 \times 20\%) \frac{1954}{40\%} + (1/4 \text{ of } 40\%) 10\% = 80\% \\ \text{(Natural Control)}$$

In comparison to the expected loss on uncontrolled areas, the accumulated loss on controlled areas will vary with the time of control and the severity of the infestation under consideration. As the emergence of the 1952 brood is expected to start in June, spring control in 1953 would need be completed by June 15. This requirement leaves little opportunity for artificial control to be directed against the 1952 infestation, which obviously would be most desirable. As a result the fall of 1953 is rather definitely set as the only feasible time for any large-scale direct control operations. Unfortunately at that time it is expected that the severity of the infestation will have increased ~~100~~ fold.

Plans of direct control are designed to locate and treat all infested trees within a specific area. This seems to be an almost impossible task. In considering the problems and difficulties associated with the direct control of the Engelmann spruce beetle in this region, control efforts are not expected to destroy more than 80 percent of the beetle population. To a large extent this untreated portion of the population continues to follow the same increase pattern as untreated infestations, until such time as normally balanced conditions prevail.

Direct control of the Engelmann spruce beetle must be justified by the over-all benefits that can be expected to accrue. Intangible values obtained from control are sometimes difficult to determine. The saving of spruce values is obviously the difference between the total accumulated loss on treated and untreated areas. This comparison can be shown by the accumulated loss formulas that have been adopted for the planning of this project.

Uncontrolled Area - 10% - 1952 Infestation

$$\frac{1952}{10\%} + (2 \times 10\%) \frac{1953}{20\%} + (2 \times 20\%) \frac{1954}{40\%} + (1/4 \text{ of } 40\%) \frac{1955}{10\%} = \frac{\text{Total}}{80\%}$$

Controlled Area - 10% - 1952 Infestation

$$\frac{1952}{10\%} + (2 \times 10\%) \frac{1953}{20\%} + (2 \times 1/5 \text{ of } 20\%) \frac{1954}{8\%} + (1/4 \text{ of } 8\%) \frac{1955}{2\%} = \frac{40\%}{(80\% \text{ Direct Control})}$$

Difference 40%

With an infestation of 10 percent, if these formulas are sound, direct control will reduce the total loss by 50 percent. That 20 percent of the infestation was treated to save 40 percent, or one tree to save two. In this manner the monetary advantage gained by control can be easily computed.

With infestations of 15 or more percent the saving in timber values lost would seldom justify the cost of direct control. This is also true of light infestations of 2 percent, which are more expensive and difficult to treat. As a result only those areas with infestations within the range of 2 and 15 percent have been considered as possibly warranting control. Furthermore, all infested areas that border the limits of the 2 to 15 percent control limits were carefully considered, as entomological justifications must often be tempered by both the economic and physical factors associated with each situation. It is also true that light infestations are more subject to the beneficial effects of natural control forces, and many areas with infestations of more than a 2 percent infestation are not expected to become serious.

The use of trap trees is being investigated. They appear to offer some advantages including lower cost and greater flexibility as to time of control. It may be desirable to use them in connection with control by logging. However, their use is in the experimental stage. Their use will be tried and tested as soon as practicable. Before too long they may be used as part of the standard control practice but at the outset trap trees will be used to a limited extent and on an experimental basis.

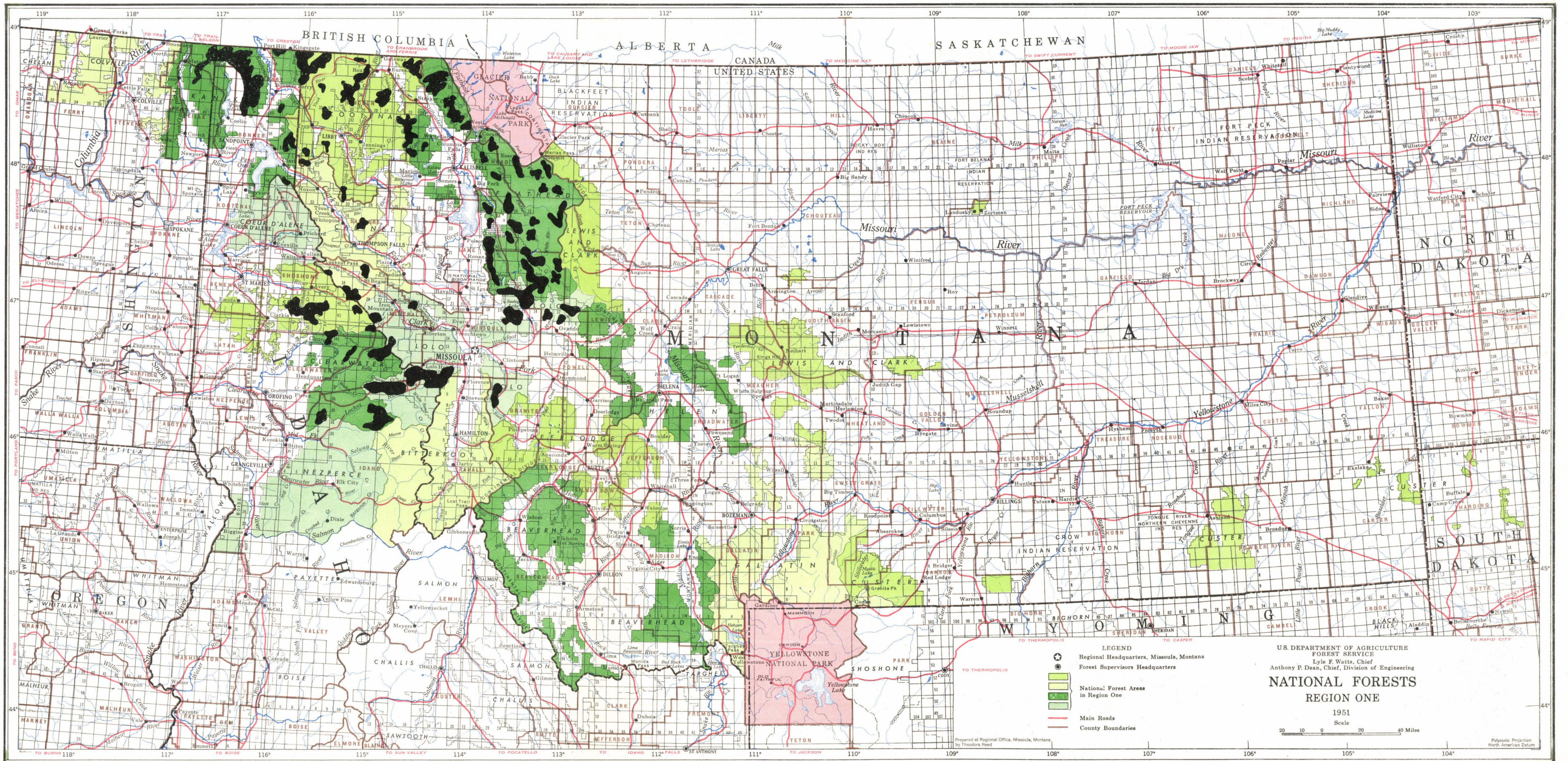
The estimated cost of chemical control is \$30 per tree. The trees are large and tall. The broods may extend over 50 feet above the ground. The proposed method of control includes locating (spotting) the infested trees, spraying the standing trees to about 30 feet, falling and bucking the tree and then spraying the remaining infested portion.

An itemized summary of the estimated cost is as follows:

Cost per tree

Insecticide	
8 gallons per tree at 50 cents	\$ 4.00
Transportation	2.00
Labor	
Spotting	4.00
Felling and bucking	2.00
Spraying (Based on two trees per day. Includes camp costs and overhead.)	10.00
Transportation	3.00
Spur Roads	
Construction of truck trails, jeep roads, etc., to facilitate the job	<u>5.00</u>
Total cost per tree	\$30.00

Ethylene dibromide will probably be used as the spray. It can be used on wet trees. This chemical is comparatively safe to use. The concentrated chemical can be taken right out to the job and diluted there with water. This saves transportation costs as compared to chemicals that must be diluted with oil. It is believed that there is an abundant supply of water convenient to the spruce stands in this region. It is understood that a supply of ethylene dibromide can be obtained from the Colorado project.



PRINCIPAL SPRUCE AREAS ON SEVEN NATIONAL FORESTS HAVING SPRUCE BARK BEETLE INFESTATION IN 1952

VIII. RECOMMENDED PLAN OF ACTION

Threatened losses from the spruce bark beetle epidemic are emphasized in the graph on the cover. The magnitude of the spruce resource in jeopardy, the location and extent of the infestation and the need for adequate, prompt, fast action have been developed in the first part of the report. Possible ways and means to control the epidemic and utilize the killed spruce have been discussed. The next and most important part of the report develops and proposes specific plans to cope with the situation.

These plans are based on the proposition that the land-managing agencies must view this epidemic as an intolerable threat to the forests in their care. Bold, aggressive action is essential. Fire control is successful because it is planned and executed to master fire. It is the duty of the land management agencies to plan and execute the control of the spruce bark beetle epidemic to master and subdue the insects. Difficulties, incomplete information, inertia, paths of least resistance and business as usual must not be allowed to kill initiative or prevent essential action. Adequate protection of the resource giving full weight to costs and benefits on a broad, long-term basis, is the objective of the plan of action developed here.

Plans and cost estimates have been prepared for control by logging. These are basic to the plans and cost estimates for spruce access roads. Plans and cost estimates have been made for control by spraying. These two kinds of plans cover a large proportion of the spruce stands known to have infestations of epidemic proportions in 1952. The other spruce stands have received consideration too. In order to present a complete picture of the entire spruce and infestation situation in and near the seven national forests the board foot spruce volume in each and every known spruce area has been classified into categories as follows:

- Control by logging over proposed roads.
- Control by logging over existing roads.
- Chemical control.
- Endemic areas.
- Deferred (or suspended) areas.
- Uncompiled data.

This classification of the total infested spruce volume by forests is shown in Table VII. The main column headings are listed above. In addition, there is a column for total spruce volume and one for the total volume of all species associated with the spruce. The total infested volume, the total spruce volume and the total volume of all species are slightly higher than shown in Table III due to additions to the basic data since Table III was prepared. All of the volumes in Tables VII, VIII and IX include those found on lands of all ownerships in and near the seven national forests.

TABLE VII

COORDINATED REGIONAL SUMMARY

TREATMENT OF INFESTED SPRUCE VOLUMES

NOTE: Attention is called to the fact that only the present 1952 infested spruce is shown in this table. The spruce to be hauled out over the roads or the spruce to be treated for control will be greater due to the increase in the infestation up to the time of treatment. There will also be salvage spruce to be hauled with the infested spruce. Therefore, this is a coordinating table and is not intended to show the amount of spruce that may be hauled or treated at any future time.

Forest	Volume of Infested Spruce - 1952 Thousand Board Feet Scribner			Control by Logging (Roads)			Chemical Control	Endemic Areas	Deferred Area (Suspended)	Uncom-piled Data	Total Infested Volume	Total Spruce Volume MBM	Total All Species Volume MBM
	Proposed	Existing	Total	Proposed	Existing	Total							
CABINET	6,852	4,945	11,797				872	1,444		20	14,133	98,589	354,977
CLEARWATER	25,983		25,983						11,679	9,684	47,346	366,430	2,290,545
FLATHEAD	23,116	3,169	26,285				2,673	18,628	196	11,739	59,521	1,969,508	5,977,117
KANIKSU	22,972	12,991	35,963				756	3,234	2,470	978	43,401	729,553	2,273,590
KOOTENAI	132,381	24,119	156,500				1,895	2,447	3,806	42,366	207,014	1,322,119	2,758,148
LOLO	18,367	5,887	24,254				8,780	381	4,908	18,900	57,223	870,184	2,775,472
ST. JOE	99,092	34,343	133,435						7,101	19,392	159,928	663,968	3,659,417
REGIONAL TOTAL	328,763	85,454	414,217				14,976	26,134	30,160	103,079	588,566	6,020,351	20,089,266
PERCENT			70.5				2.5	4.4	5.1	17.5	100.0		
PERCENT	79.4	20.6	100.0										

*Includes Upper Hay Creek #15 which was not included in Table III.

EFFECT OF PLANNED 1953 And 1954 CONTROL AND SALVAGE PROGRAMS

SEVEN NATIONAL FORESTS And ADJACENT AREAS

(LANDS OF ALL OWNERSHIPS)



CABINET



CLEARWATER



ST JOE



KANIKSU



LO LO



KOOTENAI



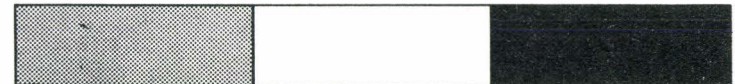
FLATHEAD

100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

SPRUCE VOLUME IN MILLIONS OF BOARD FEET (Scribners)

Legend

TOTAL SPRUCE VOLUME



CONTROL by LOGGING UNSALVAGED DEAD REMAINING GREEN

(Includes infested and dead volumes removed from logged areas) (Includes dead not salvaged by logging plus dead resulting from chemical control) (Includes endemic, unsurveyed and deferred volume)

DATA BASED ON TABLES VII and IX

Jan. 1953

TABLE VII

COORDINATED SUMMARY

TREATMENT OF INFESTED SPRUCE VOLUMES

By Forests												
		Volume of Infested Spruce - 1952 - Thousand Board Feet										
Working Circle	Compartment No.	Control by Logging (Roads)			Chemical Control	Endemic Areas	Deferred Areas (Suspended)	Uncom-piled Data	Total Infested Spruce	Total Spruce Volume	Total All Species Volume	
		Proposed	Existing	Total								
Cabinet National Forest												
Sanders	1					312			312	3,125	10,333	
	4					18			18	1,761	5,009	
	6		676	676					676	4,443	32,950	
	9					919			919	27,260	61,248	
	10					13			13	1,328	4,640	
	11	3,002		3,002					3,002	3,752	8,751	
	16					125			125	12,500	69,147	
	17		879	879					879	4,498	12,944	
Subtotal		3,002	1,555	4,557		1,387			5,944	58,667	205,022	
St. Regis	39	2,887		2,887					2,887	5,762	19,864	
	40				872				872	6,452	25,492	
	40					57			57	5,732	51,292	
	41		1,756	1,756					1,756	6,920	17,340	
	42	963		963					963	8,048	24,287	
	43		1,634	1,634					1,634	6,008	9,680	
Subtotal		3,850	3,390	7,240	872	57			8,169	38,922	145,955	
Total Reserved								20	20	1,000	4,000	
GRAND TOTAL		6,852	4,945	11,797	872	1,444		20	14,133	98,589	354,977	
Clearwater National Forest												
Kelly Creek	3	1,635		1,635					1,635	12,474	37,964	
	4	4,351		4,351					4,351	33,463	74,912	
	5	2,554		2,554					2,554	19,543	77,255	
	6	766		766					766	11,084	72,202	
	8	1,686		1,686					1,686	12,969	82,550	
	9	1,601		1,601					1,601	22,954	156,795	
	10	4,409		4,409					4,409	33,914	207,075	
	11	2,584		2,584					2,584	9,941	37,848	
	13	2,574		2,574					2,574	9,900	60,640	
	Subtotal		22,160		22,160					22,160	166,342	807,241
Canyon	30	2,363		2,363					2,363	18,180	85,280	
	33	30		30					30	234	1,560	
Subtotal		2,393		2,393					2,393	18,414	86,840	
Pierce	49	1,430		1,430					1,430	6,059	43,545	
Subtotal		1,430		1,430					1,430	6,059	43,545	
Total Unsurveyed								9,684	9,684	85,782	1,191,421	
Total Reserved							11,679		11,679	89,833	161,498	
GRAND TOTAL		25,983		25,983			11,679	9,684	47,346	366,430	2,290,545	
Flathead National Forest												
Glacier View	3					776			776	25,879	38,620	
	5	1,635		1,635					1,635	24,669	37,360	
	6					114			114	4,131	14,795	
	7	182		182					182	4,266	16,800	
	8	1,437		1,437					1,437	34,224	52,785	
	9	1,794		1,794					1,794	53,343	65,945	
	10	2,126		2,126					2,126	36,743	41,483	
	11					382			382	15,376	31,310	
	12					1,067			1,067	35,571	66,225	
	14					582			582	19,409	37,867	
	15	909		909					909	21,981	25,977	
	18					254			254	18,935	28,351	
	19					675			675	22,498	41,604	
	20					857			857	28,204	57,981	
	21		1,222	1,222					1,222	23,482	51,853	
	26					118			118	19,128	70,959	
	27					3,106			3,106	115,411	144,871	
	28	4,961		4,961					4,961	66,908	98,117	
	30					197			197	11,924	50,113	
	31					1,143			1,143	38,122	54,575	
	32					184			184	12,239	18,469	
	33					140			140	8,348	19,306	
Subtotal		13,044	1,222	14,266		9,625			*23,891	*640,791	*1,068,366	
Kalispell	3					77			77	3,312	26,706	
	4		419	419					419	8,209	22,879	
	5		232	232					232	5,871	15,036	
	6				160				160	1,973	14,321	
	7					52			52	511	1,702	
	8					167			167	5,286	12,959	
	9	767		767					767	13,267	23,011	
	10	425		425					425	10,138	20,543	
	11					227			227	9,505	15,432	
	12					86			86	2,874	6,039	
	22				156		26		182	2,537	7,186	
	23				47				47	676	1,304	
	24					120			120	4,276	23,248	
	25						4		4	78	980	
	26				33		23		56	1,930	5,524	
	29	759		759					759	7,957	10,151	
	30						143		143	2,357	4,460	
	32	217		217					217	4,563	6,716	
	33					18			18	589	2,273	
Subtotal		1,576		1,576					1,576	17,453	18,570	
Subtotal		3,744	651	4,395	396	747	196		5,734	103,362	239,147	

*Includes Upper Hay Creek #15 which was not included in Table III

TABLE VII (Continued)
COORDINATED SUMMARY
TREATMENT OF INFESTED SPRUCE VOLUMES

Revised January 10, 1953

By Forests											
Working Circle	Compartment No.	Volume of Infested Spruce - 1952 - Thousand Board Feet			Chemical Control	Endemic Areas	Deferred Areas (Suspended)	Uncom- piled Data	Total Infested Spruce	Total Spruce Volume	Total All Species Volume
		Control by Logging (Roads)		Total							
		Proposed	Existing								
Flathead National Forest (Continued)											
Coram	14					300			300	9,970	30,472
	17					17			17	546	696
	29					1,166			1,166	38,966	77,826
	33					56			56	1,862	2,394
	34					75			75	2,505	3,852
	37					1,133			1,133	37,779	61,230
	39					486			486	16,237	32,126
	50					263			263	8,780	17,120
	60					22			22	730	3,152
	69		235	235					235	29,320	48,770
	70				934				934	12,990	21,140
	71					265			265	8,820	12,600
	72				630				630	10,508	22,272
	75					34			34	1,126	1,559
	78					81			81	5,436	7,248
	80					117			117	7,826	8,040
	82					30			30	3,412	20,496
	86					150			150	4,980	4,980
	87					68			68	4,498	6,540
	88					5			5	154	388
	89					51			51	1,716	2,299
	90					21			21	685	822
	92					51			51	1,716	2,299
Subtotal			235	235	1,564	4,391			6,190	210,562	388,321
Swan Valley	17					56			56	2,325	3,263
	22				312				312	5,508	6,548
	23					16			16	525	2,460
	24	890		890					890	8,121	26,828
	26					41			41	1,672	7,870
	32		257	257					257	1,467	2,932
	33		423	423					423	2,123	3,622
	37					395			395	20,702	54,264
	38					108			108	7,136	28,570
	39					251			251	8,928	31,097
	40				401				401	8,605	19,904
	46					324			324	12,078	45,523
	48					252			252	10,778	36,132
	49					271			271	11,139	32,420
	51					613			613	27,625	51,901
	53					51			51	3,379	7,399
	55					429			429	18,768	37,278
	58					168			168	11,706	41,368
	59					710			710	21,888	90,423
	60	506		506					506	3,432	14,947
	61	522		522					522	10,383	26,414
	62	963		963					963	6,582	17,161
	66		381	381					381	3,995	10,521
	69					82			82	4,004	10,184
	81	2,967		2,967					2,967	49,987	54,269
	83					98			98	3,368	22,589
	84	480		480					480	6,480	22,002
Subtotal		6,328	1,061	7,389	713	3,865			11,967	272,704	707,889
Total Unsurveyed								9,660	9,660	429,594	2,560,718
Total Reserved								2,079	2,079	312,195	1,012,683
GRAND TOTAL		23,116	3,169	26,285	2,673	18,628	196	11,739	*59,521	*1,969,508	*5,977,117

*Includes Upper Hay Creek #15 which was not included in Table III.

Kaniksu National Forest											
Pend Orielle	108					86			86	7,192	22,376
	109					0			0	1,397	3,455
	111					0			0	5,298	12,122
	121					3			3	2,902	13,989
Subtotal						89			89	16,789	51,942
Priest River	201	516		516					516	5,946	27,008
	202	950		950					950	6,330	44,331
	203					12			12	1,050	1,500
	204	788		788					788	6,565	25,335
	205	780		780					780	8,665	52,387
	211					32			32	2,280	8,895
	212				293				293	9,300	32,780
	214					0			0	5,673	29,503
	331	193		193					193	1,610	8,885
	341		204	204					204	1,700	9,995
	353		36	36					36	894	7,885
Subtotal		3,227	240	3,467	293	44			3,804	50,013	248,444

TABLE VII (Continued)
COORDINATED SUMMARY
TREATMENT OF INFESTED SPRUCE VOLUMES

		By Forests						Revised January 10, 1953			
		Volume of Infested Spruce - 1952 - Thousand Board Feet									
Working Circle	Compart- ment No.	Control by Logging (Roads)			Chemical Control	Endemic Areas	Deferred Areas (Suspended)	Uncom- piled Data	Total Infested Spruce	Total Spruce Volume	Total All Species Volume
		Proposed	Existing	Total							
Kaniksu National Forest (Continued)											
<u>Bonnors Ferry</u>	403	1,465		1,465					1,465	11,092	31,110
	405					88			88	3,501	5,890
	407					79			79	3,169	8,031
	408	2,853		2,853					2,853	71,388	101,570
	409					175			175	7,004	17,397
	410					0			0	2,782	5,136
	417					23			23	3,076	6,796
	419		660	660					660	26,403	44,492
	420		132	132					132	1,200	1,341
	428		132	132					132	5,278	8,636
	502					224			224	7,596	17,982
	503					88			88	10,807	37,149
	504					194			194	24,343	69,290
	505	580		580					580	17,009	47,962
	507					64			64	2,184	8,683
	508					546			546	21,822	53,426
	509	803		803					803	15,353	47,334
	510					439			439	43,985	125,424
	511					387			387	15,428	63,918
	512					7			7	990	3,344
	513					25			25	3,615	9,418
	515					86			86	12,188	50,673
	516	1,484		1,484					1,484	36,919	140,531
	517					105			105	16,267	33,550
	519	3,307		3,307					3,307	62,587	179,021
	521		3,363	3,363					3,363	34,055	71,060
	522					481			481	24,097	41,204
	523					16			16	800	3,364
	525		2,940	2,940					2,940	7,844	10,614
	536					72			72	3,541	22,214
Subtotal		10,492	7,227	17,719		3,099			20,818	496,323	1,271,560
<u>Sandpoint</u>	601	4,939		4,939					4,939	39,830	63,559
	602	1,516		1,516					1,516	12,116	23,975
	603		1,081	1,081					1,081	4,325	8,165
	605		4,379	4,379					4,379	11,706	26,543
	629				312				312	3,945	16,545
	632				151				151	2,628	14,078
	633					2			2	1,114	2,763
	634	1,921		1,921					1,921	13,898	40,066
	635	140		140					140	2,404	10,814
	638						2,470		2,470	7,550	26,327
	639	224		224					224	1,725	14,856
	640	513		513					513	13,816	47,789
	702		14	14					14	337	3,325
	703		50	50					50	1,263	3,689
Subtotal		9,253	5,524	14,777	463	2	2,470		17,712	116,657	302,484
Total Uncompiled								978	978	49,771	399,160
Total Reserved											
GRAND TOTAL		22,972	12,991	35,963	756	3,234	2,470	978	43,401	729,553	2,273,590
Kootenai National Forest											
<u>Troy</u>	2	946		946					946	12,450	13,695
	3	9,362		9,362					9,362	75,502	82,983
	4	3,175		3,175					3,175	20,662	30,849
	5	699		699					699	2,797	9,812
	8	446		446					446	1,783	15,840
	9	502		502					502	6,514	9,494
	10	234		234					234	937	5,418
	14	1,673		1,673					1,673	9,068	55,837
	15	1,175		1,175					1,175	6,658	6,666
	16	636		636					636	3,487	4,446
	20	4,281		4,281					4,281	42,568	100,964
	22	835		835					835	3,340	7,105
	23	19,115		19,115					19,115	48,313	76,680
	24	3,618		3,618					3,618	14,470	17,364
	25	6,211		6,211					6,211	24,844	42,575
	26	11,049		11,049					11,049	20,117	32,571
	27	2,885		2,885					2,885	11,694	22,807
	28	4,285		4,285					4,285	18,259	24,252
	29		2,646	2,646					2,646	10,584	18,331
	30	24,288		24,288					24,288	37,893	43,815
	31						3,806		3,806	11,877	26,553
	32	1,052		1,052					1,052	4,207	23,897
	33	1,964		1,964					1,964	7,941	29,232
	34	2,218		2,218					2,218	5,157	7,162
	35		2,194	2,194					2,194	4,609	9,769
	37	2,985		2,985					2,985	19,538	34,867
	50	6,776		6,776					6,776	29,463	67,082
	62					2,356			2,356	14,708	63,611
	64	3,891		3,891					3,891	25,941	62,338
Subtotal		114,301	4,840	119,141		2,356	3,806		125,303	495,371	946,015
<u>Libby</u>	95		2,566	2,566					2,566	18,329	39,860
	97	4,491		4,491					4,491	21,305	39,615
	99	3,762		3,762					3,762	27,639	31,103
	101		2,130	2,130					2,130	13,987	19,921
	102	545		545					545	4,922	6,443
	105		6,875	6,875					6,875	88,016	139,856
	106	2,377		2,377					2,377	29,988	63,756
Subtotal		11,175	11,571	22,746					22,746	204,186	340,554

TABLE VII (Continued)

COORDINATED SUMMARY

TREATMENT OF INFESTED SPRUCE VOLUMES

By Forests								Revised January 10, 1953			
		Volume of Infested Spruce - 1952 - Thousand Board Feet									
Working Circle	Compart- ment No.	Control by Logging (Roads)			Chemical Control	Endemic Areas	Deferred Areas (Suspended)	Uncom- piled Data	Total Infested Spruce	Total Spruce Volume	Total All Species Volume
		Proposed	Existing	Total							
Kootenai National Forest (Continued)											
Fortine	120	5,705		5,705					5,705	103,802	111,058
	121					23			23	9,920	15,182
	122		2,538	2,538					2,538	16,847	24,858
	123	1,200	1,318	2,518					2,518	12,020	21,770
	124		3,230	3,230					3,230	8,397	13,963
	130		622	622					622	2,964	4,969
	132					68			68	14,547	29,025
	136				1,122				1,122	28,433	79,909
	138				773				773	19,847	45,565
Subtotal		6,905	7,708	14,613	1,895	91			16,599	216,777	346,299
Total Uncompiled								42,114	42,114	393,185	1,075,280
Total Reserved								252	252	12,600	50,000
GRAND TOTAL		132,381	24,119	156,500	1,895	2,447	3,806	42,366	207,014	1,322,119	2,758,148
Lolo National Forest											
Superior	4	1,551		1,551					1,551	11,636	20,738
	6		1,720	1,720					1,720	11,967	24,507
Subtotal		1,551	1,720	3,271					3,271	23,603	45,245
Kelly (Clearwater)	20						4,320		4,320	35,906	190,914
	21				5,280				5,280	43,936	75,340
Subtotal					5,280		4,320		9,600	77,842	266,254
Seeley Lake	23					121	1/		1/121	4,385	10,456
	24						179		179	3,029	11,739
	25		1,786	1,786					1,786	7,658	10,482
	29	565 2/		565 2/					565 2/	9,643 2/	20,434
	32					75 2/			75 2/	2,490 2/	6,406
	38						175		175	3,510	21,701
	39						95		95	1,903	12,373
	42		252	252					252	5,033	27,744
Subtotal		565	2,038	2,603		196	449		3,248	37,641	121,335
N.F. Blackfoot	47		121	121					121	2,415	7,049
	50						139		139	2,782	17,325
Subtotal			121	121			139		260	5,197	24,374
Lolo	68	744		744					744	7,433	31,739
	73					185			185	9,202	19,317
	77	2,007	2,008	4,015					4,015	14,656	22,494
Subtotal		2,751	2,008	4,759		185			4,944	31,291	73,550
Powell	78	1,900		1,900					1,900	38,000	90,000
	79	2,000		2,000					2,000	40,000	60,000
	80	7,500		7,500					7,500	150,000	300,000
	83	2,000		2,000					2,000	20,000	40,000
	84	100		100					100	1,000	45,000
Subtotal		13,500		13,500					13,500	249,000	535,000
Total Uncompiled					3,500 (Powell)			6,765	10,265	200,910	1,309,714
Total Reserved								12,135	12,135	242,700	400,000
GRAND TOTAL		18,367	5,887	24,254	8,780	381	4,908	18,900	57,223	870,184	2,775,472
St. Joe National Forest											
Fishhook	3	399	1,196	1,595					1,595	5,945	36,739
	5		5,736	5,736					5,736	32,380	94,126
	6		12,335	12,335					12,335	51,137	143,472
	7	1,994		1,994					1,994	12,877	74,653
	8	3,467		3,467					3,467	25,462	73,482
	24	13,637		13,637					13,637	26,770	102,865
	61					0			0	675	2,800
	200	17,923		17,923					17,923	71,695	130,184
	201	8,362		8,362					8,362	28,597	112,977
	202	4,287		4,287					4,287	17,861	28,586
	203	2,097		2,097					2,097	13,986	75,414
	204	624		624					624	6,236	25,212
	205	3,600		3,600					3,600	10,003	68,604
	206	2,698		2,698					2,698	26,973	65,953
	207	1,385		1,385					1,385	7,693	21,933
Subtotal		60,473	19,267	79,740					79,740	338,090	1,055,800
Upper St. Joe	27	1,295		1,295					1,295	8,686	23,420
	28	4,476		4,476					4,476	13,167	38,822
	30	2,376		2,376					2,376	19,103	99,415
	31	1,907		1,907					1,907	12,721	68,065
	32	1,421		1,421					1,421	2,687	15,145
	33	2,537		2,537					2,537	13,660	69,326
	34	2,137		2,137					2,137	7,371	19,111
	53						35		35	1,739	2,169
	56						508		508	3,385	4,495
	58						78		78	600	1,005
	59						25		25	192	264
Subtotal		16,149		16,149			646		16,795	83,311	341,237

1/Currently being sold.
2/Private underexchange.

TABLE VII (Continued)
COORDINATED SUMMARY
TREATMENT OF INFESTED SPRUCE VOLUMES

By Forests								Revised January 10, 1952			
Volume of Infested Spruce - 1952 - Thousand Board Feet											
Working Circle	Compart- ment	Control by Logging (Roads)			Chemical Control	Endemic Areas	Deferred Areas (Suspended)	Uncom- piled Data	Total Infested Spruce	Total Spruce Volume	Total All Species Volume
	No.	Proposed	Existing	Total							
St. Joe National Forest (Continued)											
Lower St. Joe	77		3,145	3,145					3,145	7,489	24,932
	78		2,455	2,455					2,455	5,178	23,820
	80		8,272	8,272					8,272	18,392	27,068
	82	20,711		20,711					20,711	30,915	40,561
	84	804		804					804	10,068	30,717
	85	955		955					955	19,105	44,658
	86						1,910		1,910	8,379	10,913
Subtotal		22,470	13,872	36,342			1,910		38,252	99,516	202,669
Little North Fork Clear-water											
208							464		464	10,309	23,518
209							1,166		1,166	4,164	4,164
214							2,915		2,915	16,198	37,351
218			1,204	1,204					1,204	15,088	46,493
Subtotal			1,204	1,204			4,545		5,749	45,759	111,526
Uncompiled								19,392	19,392	97,292	1,947,185
GRAND TOTAL		99,092	34,343	133,435			7,101	19,392	159,928	663,968	3,659,417

PLAN FOR LOGGING FOR CONTROL AND SALVAGE
NORTHERN REGION, FOREST SERVICE
POLICY GOVERNING SPRUCE BEETLE CONTROL ROADS

December 24, 1952

The outbreak of spruce bark beetles in western Montana and northern Idaho has created a serious emergency.

Control efforts will center around the removal of the infested trees with their insect broods through logging and utilization of the trees for lumber, pulpwood, or other products.

This places primary emphasis on the construction of emergency roads to the infested stands.

Road construction effort must be geared to the time requirements of insect control to remove the infested trees by the dates established.

These time requirements are so stringent that emergency methods of road location, design, contract preparation, construction, etc., are essential.

The critically urgent construction program contemplates that industry will expend about \$5,000,000 and government about \$10,000,000 for main road construction during 1953 and early 1954. In addition, it is expected that industry will construct the feeder road system costing at least \$5,000,000.

POLICY

Special emergency standards and specifications will be developed and followed in constructing roads to infested spruce stands. In setting such standards and specifications for 1953 and early 1954 road location, construction and maintenance, the objective will be to provide the minimum road facilities necessary for removal of the required volume of infested timber within the time schedules established for control and to obtain hauling costs within economic limits of the planned operation. This will require getting a travelable way through as quickly as possible by initial construction, with completion under logging traffic so that maximum time in 1953 and 1954 is available for logging infested trees. Flexibility aimed at meeting the objectives of the insect control program will be the guiding principle. The emergency standards and specifications applicable to each road project will be considered and established separately.

To the fullest practical extent the emergency roads will be constructed within the prism of a location meeting the requirements of the permanent road system. Long-term national forest development objectives will be considered so the emergency roads will

later have the maximum salvage value for further emergency and normal forest use. Emergency roads built in accordance with these objectives obviously will in many cases result in high hauling costs. It will be the policy to correct this condition as soon as practicable.

Public hearings on road construction and betterment projects which may be built under this program from public funds will be held sufficiently in advance to meet the time schedules established for insect control.

Regional guides to emergency road standards and specifications follow.

REGIONAL GUIDES

Route Selection and Survey

The importance of route selection and thorough reconnaissance in this emergency program cannot be overemphasized. It is extremely urgent that as much of this work as possible be undertaken and completed this winter. The assistance and talent of local people familiar with the terrain will be utilized to the fullest practical extent in this work. An early start should be made to assemble all the practical aids which will help to do this job in a complete and realistic manner. Such aids will include the use of aerial photos and, where necessary, aerial reconnaissance. Forests will start immediately to take the steps to insure timely accomplishments of this most important job.

Location survey specifications for each project will be set up with the idea that the work will be simplified to the extent practical. Inspection of the survey and decision with respect to final adjustment of location will be made on the ground. Field design by the engineer supervising construction will be employed to the extent practical in each case.

Gradient, Alignment, Curvature, Width

Unless time requirements dictate localized departure at specific problem points, such as rock cliffs, stream crossings, etc., gradient, alignment and curvature will conform to established standards for the class of permanent road which will eventually be completed on that location. Unless extenuating circumstances justifying different treatment exist, emergency roads will be constructed to provide a single lane with only the minimum number of turnouts consistent with sight distance and expected traffic.

Minimum road width shall be 14 feet for unsurfaced sections. Where surfaced, minimum top width will be 12 feet. Additional

width for a ditch will be provided where a drainage ditch is necessary to provide a usable road. If it is contemplated that before this emergency is over that surfacing will have to be applied to any section, the sub-base width of road will be increased to provide for the indicated necessary depth of surfacing.

Construction Specifications and Methods

Clearing. Clearing will be by dozer or other methods which will give the desired results and meet time requirements. Clearing debris will be moved outside the roadway prism and will not be covered in the fill.

Along main roads subject to substantial public travel, unmerchantable material and debris will be piled for future burning in the most effective manner. These piles may be placed in existing openings in the timber or the clearing may be widened a sufficient amount to accommodate the piles. There should be sufficient cleared ground between the pile and the edge of the clearing so that the debris can be burned without damage to standing timber.

Along other roads unmerchantable material and debris will be placed in windrows or piles in condition for burning outside of the roadway prism on those sections where the volume of slash and other conditions warrant disposal by burning to reduce fire hazard. On steep side slopes and in other situations where the nature of the slash and debris does not warrant disposal by burning it will simply be removed from the roadway prism.

Merchantable material will be felled, bucked and skidded to decks outside the roadway prism or will be pushed out of the clearing. This material will be salvaged as soon as practical in view of time schedules and, if salvage is delayed, subsequent treatment to kill insect broods may be required.

Excavation. Objective will be to push the rough grading work as rapidly as possible. Quantities will be balanced (by eye is permissible) and grades will be undulated or rolled to the extent deemed practical in the interest of saving initial construction time to provide a usable road. If demanded by time requirements, temporary detours from permanent location will be made at problem points, such as rock cliffs, sharp draws requiring high fills or high bridges. To the extent possible roads will be made available and used for log hauling and other control work during and along with construction.

Backsloping. To facilitate economical construction and stable banks it will be the objective to provide slope stakes on all roads. The backslopes will be constructed substantially on the slopes as staked, which will be the steepest on which the soil concerned can reasonably be expected to stand under wet conditions. No special dressing of backslopes will be required other than that obtainable with dozers or other earth-moving equipment.

Culverts. The Forest Service will plan to stockpile culvert pipe of various sizes and in sufficient quantity to currently supply the pipe needed for each road to be constructed under this insect control program. The Forest Service will endeavor to furnish the necessary pipe and may deliver it to the project. If, for any reason, the Forest Service is unable to furnish the pipe when needed, temporary type culverts constructed of native material will be used.

Temporary type culverts will not be placed under high fills on the permanent location. In such cases where culvert pipe is not available the road should be placed on a temporary detour route off the permanent location and the pipe installed in its proper location when the permanent culvert becomes available.

Bridges. The plan will be to install bridges so that this construction is not a factor in upsetting the time schedule for removal of infested timber.

The long-term public interest will best be served by the installation of permanent type bridges on permanent road locations and it will be the policy to construct these bridges from public funds insofar as practicable.

Where necessary to facilitate initial hauling of infested timber, the least expensive low-water bridges or other temporary crossing will be placed on temporary detours from the permanent locations and will be replaced with permanent type structures as soon as practicable. In scheduling bridge construction, highest priority will be given to providing permanent type bridges where needed to speed up the movement of infested timber.

Gravelling. Where the planned beetle control logging for 1953 can be accomplished over ungravelled or spot gravelled roads, it will be the policy to do so unless additional gravel, needed in 1954, can be put in place in 1953 without upsetting the 1953 time schedule. On most of the ungravelled spruce logging roads it will be necessary to have an adequate gravelling job done before the 1954 logging season if the logging is to be extended to as long a season as possible. Where the ungravelled road will serve for the initial needs in 1953, it will be so used. If the gravelling job is to be required for the following year it will be accomplished as a betterment job of reconstructing or bringing up the standard of the 1953 emergency road.

Construction by Timber Operator, Contract, or Force Account. Roads will be built by contract, force account, or operator, or by a combination of these methods, whichever is most expeditious and logical in meeting the objectives of the insect control plan. Roads will usually be built by operator where the value

and volume of timber to be removed is high enough and the cost of the road is low enough to make an economically justifiable operation from the operator viewpoint. It is contemplated that about two-thirds of the main-haul roads will be financed with appropriated funds and built either by contract or force account.

Roads will be let to contract which can be ready for advertising early in 1953, or in adequate time to assure completion in time to meet the objectives of the control program. The contract time allowed in each case will be tailored to meet the control schedule.

Roads which do not qualify for operator construction and for which time or other factors will not permit construction by contract, will be built by force account with hired equipment and construction started at the earliest possible date. For this kind of work, a usable road must be completed to the emergency specifications within the average of \$10,000 per mile statutory limitation.

For each operator-built project the timber sale contract will specifically state the portions of the project for which each party of the contract is responsible.

Maintenance. Maintenance of emergency spruce bark beetle roads will be very heavy during the year following the initial completion of construction. Roads constructed from public funds will ordinarily be carried as a government responsibility until the roads are sufficiently stabilized to require only normal maintenance. Work done on these roads during the stabilization period will be financed from construction and not from maintenance allocations. Thereafter, locally for each situation, a maintenance plan will be developed so that insofar as practical, maintenance requirements commensurate with use will be the obligation of timber purchasers.

Maintenance of roads constructed by timber purchasers will be their responsibility for the duration of timber sales contracts. Where two or more timber purchasers jointly use a road, maintenance effort will be pooled or definite assignments of responsibility made to equalize cost based on timber hauled.

FOREST SERVICE

POLICY GOVERNING SALES OF BEETLE INFESTED SPRUCE

December 24, 1952

The serious emergency arising from the spruce bark beetle infestation in Montana and Idaho requires "all-out" action to protect the valuable spruce sawtimber resource from destruction. Excepting the seasonal requirements of fire control and other "must" work, action to suppress and control the spruce bark beetle will have first priority in work plans for the region and the forests affected during 1953.

Successful control measures require substantial reduction of bark beetle populations within entomological units during the remainder of F.Y. 1953 and F.Y. 1954. "Time" is the most critical factor affecting control operations. In planning and making decisions relating to control operations it will be a guiding principle to adopt the course which will favor "speed" in removing the greatest volume of infested timber in the shortest possible time, but with due regard to the efficient use of finances.

Control by logging offers the most economical means of reducing beetle populations and will be used to the limit of the capacity of industry to participate. Logging for control is only feasible and practical when the infested trees removed can be subsequently processed and marketed for lumber, pulpwood, or other products, at prices which will return operating costs plus a fair margin for profit and risk. To help meet the "time" requirements for control by logging, the following guides are established:

- (1) As many of the haul roads as practical, to and within the infested areas, will be built by timber purchasers. The rest, considered to be a major portion of the required roads, will be built from appropriated funds. Construction will be carried out on time schedules to achieve beetle control objectives and under the policy established for emergency beetle control roads.
- (2) Usually only nominal volumes of other species will be included in sales of infested timber, and that only if necessary. Other timber will be included where analysis and appraisal indicates marginal values for infested spruce and where the inclusion of additional volume will make the operation economic and will not appreciably affect the time schedules established for control. This will usually involve cases where the inclusion of such additional volume is critical to the operation of prospective purchasers or where it is deemed desirable to keep loggers in spruce areas by providing their minimum needs for other species. The guiding principle will be that inclusion of other species must not reduce the volume of infested spruce that could be logged during the season favorable for spruce logging.

- (3) The salvage of merchantable beetle-killed spruce after beetle broods have left it but before it deteriorates is second only to need to reduce beetle populations and control the infestation. Some salvage material may be included in sales of infested timber for economic reasons, provided its inclusion does not operate to reduce the required volume of infested trees to be removed to meet the time schedules for control.

If, after detailed planning, study and analysis, certain areas are determined to be uneconomic for commercial logging or where time requirements cannot be met by the logging method, such areas will be considered for chemical or other methods of control in order to complete the control action by entomological units.

In initially planning the control action no area will be arbitrarily placed in the sacrifice class. Problem areas which do not qualify for immediate action will be placed in a suspended category subject to further survey, study and analysis.

Action plans for control will be localized and developed by drainages or compartments. Such plans will be developed on the ranger districts and carried out under the leadership of the forest supervisor and staff. Regional Division of Timber Management will coordinate the over-all regional control program with the technical entomological assistance of BEPQ.

Success of control effort will depend upon preparation of realistic "action plans" on the forests and the speed and strength that can be marshalled to reduce beetle populations during 1953 and 1954 and at any subsequent period that control operations are required.

Careful, realistic timber appraisals are essential to establish relative timber values between "face chances" and back country areas, and to accurately gauge what is required to remove the infested volume from each drainage or compartment. Increased costs of operation due to abnormal conditions are special requirements in sales of infested timber will be taken into account in timber appraisals. Stumpage value in sales of infested timber will be determined by standard appraisal methods now in use which will consider the quality of the timber and analysis of operating costs and lumber and other product prices in the region during a sufficient period to form a reasonable basis for determination of values.

Logging slash disposal will be accomplished by the Forest Service through cooperative deposits by the timber purchasers. For each area at the time sale is prepared a slash disposal plan and appraisal will be made to determine the cost of disposing of a sufficient amount of the logging slash to reduce the fire hazards to a tolerable degree. Such plans and appraisals will consider the need for supplemental protection until such time as the slash hazard can be reduced.

Timber stand improvement work under the provisions of the K-V Act will not be attempted in sales of infested spruce except on those specific areas showing positive stumpage values where the cut is heavy and there may be a need to establish a new stand by artificial means.

It is recognized that the marking of infested timber for cutting will be costly and time-consuming. Remarketing, and in some cases, relogging during and after the flight season for the insects may be required and timber sales agreements will be drawn accordingly.

Scaling practices must continue to maintain high integrity from a fiscal and business standpoint. Under this guiding rule, methods will be streamlined as far as it is practical to do so.

On the affected forests preparation and administration of spruce insect control sales and the spruce insect control program will be given first priority in timber management activities. This will mean curtailment of sales of noninsect timber except as may be needed to facilitate the program. New sales of spruce from uninfested areas will not be made. It will be the policy to discourage logging of uninfested spruce under long term sales now active. Through extension of time, waiver of periodic cut requirements, or other means, hold the cut of noninfested, nonsalvage spruce to a minimum on all forests of the region in order to save the full strength of the market for infested and salvage spruce.

Full publicity will be given to the spruce insect control problem and the steps being taken to meet it. To the extent practical and feasible, publicity will be coordinated with BEPQ and industry. All publicity should be so phrased that the result is to uphold and not depreciate the value of spruce as a prime forest resource providing valuable lumber and pulping wood.

To the fullest extent practical, action plans will be developed for the 1953 logging season so that they are understood by industry as soon as possible.

Spruce Emergency Roads

Existing roads were used to the fullest practicable extent in planning for control logging. The additional Forest Service and operator main haul roads required for logging for control and salvage are shown in Table VIII. Maps of the seven national forests showing these roads and the infested and noninfested spruce areas follow Table IX. Table IX shows how planned and existing roads were planned to remove infested and salvage spruce in 1953 and 1954. It also records the 1952 infested volume related to each road and an estimate of the infested and salvage volume to be hauled over each road in 1953 and 1954. This is termed "Planned Production." The volume of green and dead spruce remaining in 1955 is also shown. This table demonstrates how the access road planning was coordinated and projected into the future in order to obtain the removal of the largest practicable amount of infested spruce as the epidemic develops.

Table IX is not a forecast of what will happen. Rather, it is a systematic plan to cope with present and assumed future conditions. This plan can be readily revised and adjusted to meet the actual development of the epidemic. It is also useful for its estimate of the residual spruce volume in 1955 under the planned program. Under the assumptions used in this planning a considerable part of the spruce volume shown as green in 1955 will owe its survival in this condition to the removal of infested spruce over the planned roads. Preservation of a major amount of green spruce is the objective of the planned spruce emergency roads.

In Table VIII the planned Forest Service and operator roads are listed by two programs - A and B. This classification was made to facilitate the preparation of budget estimates. Program A includes (1) roads that are practical to construct to haul out infested spruce in 1953 and (2) roads whose construction is so time-consuming that they must be started early in 1953 in order to be ready to haul infested spruce in 1954. (The term "infested spruce" as used here means actively infested spruce the removal of which will decrease the beetle population and tend to control the epidemic.) Such roads are started in the A Program and completed to the point of being ready for hauling in 1954 in the B Program. Program B includes the 1954 work on these two-year roads and roads that do not need to be started until 1954 (or possibly late 1953) because they depend upon connecting roads to be built in 1954. In assigning roads to programs A and B account was taken of the degree of present and assumed future infestation and the amount of spruce in jeopardy. Other things being equal, the more urgent situations were met by planning roads to be completed in 1953 under program A and the less urgent situations were put under program B. Doubtful cases or those where additional information is required tended to be placed in program B.

In order to qualify for control by logging, involving the construction of an access road, spruce areas had to have an

infestation of over 3 percent by volume in 1952 and ordinarily a minimum of 2,000 board feet per acre of infested and salvage spruce at the planned time of logging. The objective was to give preference to the greatest practicable extent to the removal of infested spruce during the 1953 season (which will end with the 1954 flight of the beetles) provided there is a reasonable expectation of removing a volume of infested spruce at least equal in amount to that infested in 1952. The existence of entomological units that would limit the spread of the infestation was assumed. The possible use of felled trees to attract the beetles in connection with control by logging was given consideration in planning the access roads.

All of the plans for roads will, of course, be subject to revisions and adjustments as information becomes available about the development of the epidemic in 1953 and 1954.

TABLE VIII

Summary of Additional Forest Service and Operator
Main Haul Roads Required for Insect Control and Salvage -
Spruce Bark Beetle Epidemic - Region One

Forest	A Program				:	B Program				:	Total			
	Forest Service		Operator		:	Forest Service		Operator		:	Forest Service		Operator	
	Miles :	Cost	Miles:	Cost	:	Miles :	Cost	Miles :	Cost	:	Miles :	Cost	Miles :	Cost
Cabinet	24.5	169,000	9.5	82,000		0	0	0	0		24.5	169,000	9.5	82,000
Clearwater	22.5	555,000	7.0	350,000		44.0	1,675,000	0	0		66.5	2,230,000	7.0	350,000
Flathead	29.0	880,000	10.0	225,000		48.0	926,000	35.3	795,000		77.0	1,806,000	45.3	1,020,000
Kaniksu	41.0	632,500	27.5	274,000		34.0	415,000	17.5	281,000		75.0	1,047,500	45.0	555,000
Kootenai	78.0	2,099,000	42.0	819,000		33.2	605,000	51.3	715,000		111.2	2,704,000	93.3	1,534,000
Lolo	48.5	436,000	7.0	75,000		5.0	30,000	0	0		53.5	466,000	7.0	75,000
St. Joe	22.0	377,000	28.0	667,000		41.0	1,144,000	49.0	1,374,000		63.0	1,521,000	77.0	2,041,000
TOTAL	265.5	5,148,500	131.0	2,492,000		205.2	4,795,000	153.1	3,165,000		470.7	9,943,500	284.1	5,657,000

TABLE VIII

Additional Forest Service and Operator Main Haul Roads
Required for Insect Control and Salvage -
Spruce Bark Beetle Epidemic - Region One

Cabinet National Forest

Number	Name	Program	Class	Length	Cost
				Miles	Dollars
<u>Forest Service</u>					
<u>St. Regis W. C.</u>					
282	Little Joe	A	EE-14	3.5	20,000
221	South Fork Little Joe	A	EE-14	7.0	42,000
352	Twelve Mile	A	EE-12S	9.0	67,000
	<u>Total</u>			19.5	129,000
<u>Sanders County W. C.</u>					
---	Graves Creek	A	EE-14	5.0	40,000
	<u>Total</u>			5.0	40,000
	Total A Program			24.5	169,000
	Total B Program			---	---
	<u>Grand Total</u>			24.5	169,000
<u>Operator</u>					
<u>St. Regis W. C.</u>					
352A	Mineral Mountain	A	EE-14	2.5	25,000
352B	Trapper Cabin	A	EE-14	3.0	30,000
	<u>Total</u>			5.5	55,000
<u>Sanders County W. C.</u>					
---	Graves Creek	A	EE-14	4.0	27,000
	<u>Total</u>			4.0	27,000
	Total A Program			9.5	82,000
	Total B Program			---	---
	<u>Grand Total</u>			9.5	82,000

1/ Program A includes all main haul roads to be constructed in order to attain 1953 and 1954 insect control and salvage goals.

Program B includes additional main haul roads to be constructed in order to attain 1954 insect control and salvage goals.

TABLE VIII

Additional Forest Service and Operator Main Haul Roads
Required for Insect Control and Salvage -
Spruce Bark Beetle Epidemic - Region One

Clearwater National Forest

Number	Name	Program	Class	Length Miles	Cost Dollars
<u>Forest Service</u>					
<u>Kelly Cr. W. C.</u>					
251	Fish Lake	A	DD-16S	4.0	210,000
249	Cedars-Kelly Creek	A	DD-16S	3.0	157,000
	485 Extension	A	EE-12S	3.0	60,000
485	Model Mountain	B	EE-12S	4.0	80,000
485	Model Mountain	A	EE-12S	3.0	60,000
250	North Fork Clearwater	A	EE-12S	7.5	8,000
251A	Goose Creek	B	EE-12S	2.0	60,000
---	Hidden Creek	A	EE-12S	2.0	60,000
249A	West Spur	B	EE-12S	6.0	300,000
249D	Swamp Creek	B	EE-12S	4.0	80,000
	<u>Total</u>			38.5	1,075,000

Canyon W. C.

518A	Grizzly Creek	B	EE-12S	2.0	60,000
671	Rock Creek-Cold Springs	B	EE-12S	6.0	180,000
418	Pierce-Kelly	B	DD-16S	3.0	225,000
	<u>Total</u>			11.0	465,000

Pierce W. C.

529	Holo-Eldorado	B	DD-16S	15.0	630,000
529A	Dollar Creek	B	EE-12S	2.0	60,000
	<u>Total</u>			17.0	690,000
	Total A Program			22.5	555,000
	Total B Program			44.0	1,675,000
	<u>Grand Total</u>			66.5	2,230,000

Operator

Kelly Cr. W. C.

250B	Deception Creek	A	DD-16S	7.0	350,000
	<u>Total</u>			7.0	350,000
	Total A Program			7.0	350,000
	Total B Program			---	---
	<u>Grand Total</u>			7.0	350,000

1/ Program A includes all main haul roads to be constructed in order to attain 1953 and 1954 insect control and salvage goals. Program B includes additional main haul roads to be constructed in order to attain 1954 insect control and salvage goals.

TABLE VIII

Additional Forest Service and Operator Main Haul Roads
Required for Insect Control and Salvage -
Spruce Bark Beetle Epidemic - Region One

Flathead National Forest

Number	Name	Program	Class	Length	Cost
				Miles	Dollars
<u>Forest Service</u>					
<u>Glacier View W. C.</u>					
210	North Fork Flathead	A	DD-16S	10.0	500,000
376	Hay Creek-Shorty Creek	A	EE-12S	4.0	80,000
376	Hay Creek-Shorty Creek	B	EE-12S	10.0	224,000
210	North Fork Flathead	B	(DD-12S)		
			(DD-16S)	13.5	300,000
	<u>Total</u>			37.5	1,104,000
<u>Kalispell W. C.</u>					
113	Tally Lake-Brush Creek	B	EE-12S	2.0	30,000
60	Good Creek	B	EE-14	16.5	240,000
	<u>Total</u>			18.5	270,000
<u>Swan Valley W. C.</u>					
561	Craft Creek	A	EE-12S	6.5	135,000
---	Glacier Creek	A	EE-12S	1.5	15,000
558	Goat Creek-Alder Creek	A	EE-12S	3.0	60,000
558A	Van Lookout	A	EE-12S	4.0	90,000
903	Cold Creek-Rumble Creek	B	EE-12S	2.0	43,000
129	Swan Lake	B	EE-12S	4.0	89,000
	<u>Total</u>			21.0	432,000
	Total A Program			29.0	880,000
	Total B Program			48.0	926,000
	<u>Grand Total</u>			77.0	1,806,000

TABLE VIII

Flathead National Forest (Continued)

Number	Name	Program	Class	Length	Cost
				<u>Miles</u>	<u>Dollars</u>
<u>Operator</u>					
<u>Glacier View W. C.</u>					
317	Coal-Hallowatt Creek	A	EE-12S	5.0	112,000
907	Tecpee Creek	B	EE-12S	11.8	267,000
318	Whale Creek	B	EE-12S	6.0	135,000
376	Hay-Shorty Creek	A	EE-12S	5.0	113,000
376	Hay-Shorty Creek	B	EE-12S	6.5	146,000
	<u>Total</u>			34.3	773,000
<u>Kalispell W. C.</u>					
60B	Bowen Creek	B	EE-12S	2.5	48,000
---	Sylvia Creek	B	EE-12S	2.0	45,000
113A	Sheppard Creek	B	EE-12S	2.0	45,000
	<u>Total</u>			6.5	138,000
<u>Swan Valley W. C.</u>					
554B	Napa Peak	B	EE-12S	2.5	66,000
903	Cold Creek-Rumble Creek	B	EE-12S	2.0	43,000
	<u>Total</u>			4.5	109,000
	Total A Program			10.0	225,000
	Total B Program			35.3	795,000
	<u>Grand Total</u>			45.3	1,020,000

1/Program A includes all main haul roads to be constructed in order to attain 1953 and 1954 insect control and salvage goals.

Program B includes additional main haul roads to be constructed in order to attain 1954 insect control and salvage goals.

TABLE VIII

Additional Forest Service and Operator Main Haul Roads
 Required for Insect Control and Salvage -
 Spruce Bark Beetle Epidemic - Region One

Kaniksu National Forest

Number	Name	Program	Class	Length	Cost
				Miles	Dollars
<u>Forest Service</u>					
<u>Sandpoint W. C.</u>					
231	Pack River	A	EE-14	2.5	40,000
231A	West Branch	A	EE-14	2.5	7,500
419	Lightning Creek	A	EE-16S	15.0	340,000
419A	Rattle Creek	A	EE-14	7.0	105,000
419B	Wellington Creek	A	EE-14	7.0	70,000
	<u>Total</u>			34.0	562,500
<u>Bonnors Ferry W. C.</u>					
281	Smith Creek	B	EE-14	15.0	170,000
—	Canuck Creek	A	EE-14	7.0	70,000
	<u>Total</u>			22.0	240,000
<u>Priest River W. C.</u>					
282	Boundary Creek	B	EE-14	12.0	175,000
637	Upper Priest River	B	EE-14	1.0	10,000
637A	Lime Creek	B	EE-14	3.0	30,000
662	Little Snowy	B	EE-14	3.0	30,000
	<u>Total</u>			19.0	245,000
	Total A Program			41.0	632,500
	Total B Program			34.0	415,000
	<u>Grand Total</u>			75.0	1,047,500

TABLE VIII
Kaniksu National Forest (Continued)

Number	Name	Program	Class	Length	Cost
				Miles	Dollars
<u>Operator</u>					
<u>Bonnars Ferry W. C.</u>					
272A	Hall Mountain	A	EE-14	2.5	25,000
---	Canuck	A	EE-14	7.0	65,000
---	Saddle Creek	B	EE-14	3.0	36,000
432	Ball Creek	B	EE-14	12.5	200,000
633	Myrtle Creek	A	EE-14	9.0	180,000
	<u>Total</u>			34.0	506,000
<u>Priest River</u>					
333	Goose Creek)	A)			
333A	North Spur)	A)			
659	Solo Creek)	A)			
659A	South Spur)	A)	EE-14	8.0	4,000
662	Little Snowy	B	EE-14	3.0	45,000
	<u>Total</u>			11.0	49,000
	Total A Program			27.5	274,000
	Total B Program			17.5	281,000
	<u>Grand Total</u>			45.0	555,000

1/ Program A includes all main haul roads to be constructed in order to attain 1953 and 1954 insect control and salvage goals.

Program B includes additional main haul roads to be constructed in order to attain 1954 insect control and salvage goals.

TABLE VIII

Additional Forest Service and Operator Main Haul Roads
Required for Insect Control and Salvage --
Spruce Bark Beetle Epidemic - Region One

Kootenai National Forest

Number :	Name	: Program	: Class	: Length :	Cost
				<u>Miles</u>	<u>Dollars</u>
<u>Forest Service</u>					
<u>Libby W. C.</u>					
337	Boulder Creek	A	EE-12S	10.0	250,000
751	Little North Fork	A	EE-14	5.0	90,000
303	Ferry Road	A	EE-12S	4.0	72,000
92E	Young Creek Conn.	A	EE-12S	2.0	36,000
	<u>Total</u>			21.0	448,000
<u>Fortine W. C.</u>					
114	Graves Creek-Trail Creek	A	EE-12S	4.0	84,000
---	Clarence Rich Creek	A	EE-12S	17.0	447,000
	<u>Total</u>			21.0	531,000
<u>Troy W. C.</u>					
524	Meadow Creek	A	EE-12S	3.0	60,000
524a	N. F. Meadow Creek	A	EE-12S	7.0	140,000
68	Pipe Creek-S. F. Yaak	A	EE-16S	20.0	800,000
92	Yaak Valley-West Side	A	EE-16S	6.0	120,000
92	Yaak Valley-West Side	B	EE-16S	15.0	120,000
338	Pete Creek	B	EE-12S	17.2	385,000
176	Yaak River-East Side	B	Bridge) & Conn.)	1.0	100,000
	<u>Total</u>			69.2	1,725,000
	Total A Program			78.0	2,099,000
	Total B Program			33.2	605,000
	<u>Grand Total</u>			111.2	2,704,000

TABLE VIII

Kootenai National Forest (Continued)

Number	Name	Program	Class	Length	Cost
				Miles	Dollars
<u>Libby W. C.</u>					
494	Sutton-Swamp Creek	B	EE-14	13.0	47,000
	<u>Total</u>			13.0	47,000
<u>Troy Working Circle</u>					
384A	Hyatt Creek	A	EE-12S	4.0	65,000
339	Spread Creek	A	EE-12S	7.0	135,000
176	Yaak River-East Side	A	EE-12S	6.0	120,000
752	O'Brien Creek	A	EE-12S	7.0	140,000
524	S. F. Meadow Creek	A	EE-12S	4.0	66,000
470	Dodge Summit	A	EE-12S	5.0	113,000
92H	Grizzley Point Spur	A	EE-12S	9.0	180,000
276A	French Creek	B	EE-14	4.0	66,000
276B	Bonnet Top	B	EE-14	2.0	30,000
757	Kookoo Creek	B	EE-14	4.3	60,000
92D	Blacktail	B	EE-14	2.0	30,000
338A	South Fork Hawkins	B	EE-12S	5.0	96,000
523	Mount Obermayer	B	EE-12S	3.0	60,000
276	West Fork Yaak	B	EE-14	5.0	72,000
472	Burnt Creek-Coal Creek	B	EE-12S	10.0	200,000
---	Arbo Mountain	B	EE-12S	3.0	54,000
	<u>Total</u>			80.3	1,487,000
	Total A Program			42.0	819,000
	Total B Program			51.3	715,000
	<u>Grand Total</u>			93.3	1,534,000

1/ Program A includes all main haul roads to be constructed in order to attain 1953 and 1954 insect control and salvage goals.

Program B includes additional main haul roads to be constructed in order to attain 1954 insect control and salvage goals.

TABLE VIII

Additional Forest Service and Operator Main Haul Roads
Required for Insect Control and Salvage -
Spruce Bark Beetle Epidemic - Region One

Lolo National Forest

Number		Program	Class	Length	Cost
				Miles	Dollars
Forest Service					
Superior-Nine Mile W. C.					
320	Cedar Creek	A	EE-14	8.5	33,000
	<u>Total</u>			8.5	33,000
Lolo W. C.					
461	E. F. Lolo Creek	A	EE-14	5.0	40,000
699	Lee Creek	B	EE-14	5.0	30,000
	<u>Total</u>			10.0	70,000
Powell W. C.					
245	Packers Meadows	A	EE-14	6.5	30,000
245	Packers Meadows	A	EE-14	10.5	120,000
369B	Brushy Fork	A	EE-14	8.0	108,000
---	Wendover Ridge	A	EE-14	6.0	60,000
---	Badger Creek	A	EE-14	4.0	45,000
	<u>Total</u>			35.0	363,000
	Total A Program			48.5	436,000
	Total B Program			5.0	30,000
	<u>Grand Total</u>			53.5	466,000
Operator					
Seeley Lake W. C.					
552	W. F. Clearwater	A	EE-14	7.0	75,000
	<u>Total</u>			7.0	75,000
	Total A Program			7.0	75,000
	Total B Program			---	---
	<u>Grand Total</u>			7.0	75,000

1/ Program A includes all main haul roads to be constructed in order to attain 1953 and 1954 insect control and salvage goals.

Program B includes additional main haul roads to be constructed in order to attain 1954 insect control and salvage goals.

TABLE VIII

Additional Forest Service and Operator Main Haul Roads
Required for Insect Control and Salvage -
Spruce Bark Beetle Epidemic - Region One

St. Joe National Forest

Number :		: Program / Class :		Length :	Cost
				<u>Miles</u>	<u>Dollars</u>
<u>Forest Service</u>					
<u>Lower St. Joe W. C.</u>					
216	Homestead	A	EE-12S	10.0	57,000
321	Clarkia-Marble Creek	B	EE-12S	7.0	134,000
510	Upper Marble	B	EE-12S	5.0	100,000
---	Hobo	B	EE-14	1.5	30,000
	<u>Total</u>			23.5	321,000
<u>Upper St. Joe W. C.</u>					
218	St. Joe River	A	DD-16S	7.0	300,000
218	St. Joe River	B	DD-16S	13.5	568,000
	Simmons Connection	A	EE-12S	5.0	20,000
388	Gold Creek	B	EE-12S	7.0	150,000
339	Quartz Creek	B	EE-12S	7.0	162,000
	<u>Total</u>			39.5	1,200,000
	Total A Program			22.0	377,000
	Total B Program			41.0	1,144,000
	<u>Grand Total</u>			63.0	1,521,000
<u>Operator</u>					
<u>Lower St. Joe W. C.</u>					
321B	Norton Creek	B	EE-12S	3.0	87,000
---	Hobo	B	EE-14	2.5	80,000
---	Cornwall	B	EE-14	2.5	80,000
	<u>Total</u>			8.0	247,000
<u>Upper St. Joe</u>					
339A	Entente	B	EE-14	3.5	60,000
218E	Tumbledown Creek	B	EE-12S	4.0	120,000
218G	Bruin Creek	B	EE-12S	3.5	81,000
511	Simmons Creek	A	EE-12S	2.0	36,000
511A	Three Lakes	A	EE-12S	2.5	45,000
	<u>Total</u>			15.5	342,000

TABLE VIII

St. Joe National Forest (Continued)

Number :		Program	Class	Length :	Cost
				<u>Miles</u>	<u>Dollars</u>
<u>Operator (Continued)</u>					
<u>Fishhook W. C.</u>					
530	Fishhook Creek	A	DD-16S	5.0	165,000
530	Fishhook Creek	B	DD-16S	12.0	390,000
530A	Outlaw Creek	A	DD-16S	2.5	81,000
---	Upper Road	A	DD-16S	10.0	232,000
---	Spotted Louis	A	EE-12S	6.0	108,000
787	Rocky Run	B	EE-12S	3.5	96,000
761	Rutledge Creek	B	EE-12S	5.0	90,000
530B	Mawich Creek	B	EE-12S	2.5	60,000
530D	Butte Creek	B	EE-12S	4.0	140,000
530C	Montana Creek	B	EE-12S	3.0	90,000
	<u>Total</u>			53.5	1,452,000
	Total A Program			28.0	667,000
	Total B Program			49.0	1,374,000
	<u>Grand Total</u>			77.0	2,041,000

¹/ Program A includes all main haul roads to be constructed in order to attain 1953 and 1954 insect control and salvage goals.

Program B includes additional main haul roads to be constructed in order to attain 1954 insect control and salvage goals.

TABLE IX (Continued)

REGIONAL SUMMARY

COORDINATED PLAN

LOGGING FOR CONTROL AND SALVAGE

SPRUCE BARK BEETLE CONTROL

(Thousand Board Feet - Scribner)

Forest	Total Volume All Species	Total Spruce Volume	Infested Spruce Volume			Planned Spruce Production						Remaining Spruce Volume in 1955	
						1953			1954				
			1952	1953	1954	Salvage	Infested	Total	Salvage	Infested	Total	Dead	Green
<u>Cabinet National Forest</u>													
Proposed	52,902	17,562	6,852	5,551	0	6,852	5,551	12,403	0	0	0	0	5,159
Existing	72,914	21,869	4,945	9,890	0	4,945	9,890	14,835	0	0	0	0	7,034
Total	125,816	39,431	11,797	15,441	0	11,797	15,441	27,238	0	0	0	0	12,193
<u>Clearwater National Forest</u>													
Proposed	937,626	190,815	25,983	51,966	53,570	5,166	19,132	24,298	32,852	53,570	86,422	20,799	59,296
Existing	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	937,626	190,815	25,983	51,966	53,570	5,166	19,132	24,298	32,852	53,570	86,422	20,799	59,296
<u>Flathead National Forest</u>													
Proposed	582,079	380,497	23,116	46,232	54,414	5,485	18,970	24,455	27,262	54,414	81,676	17,631	256,735
Existing	155,613	74,467	3,169	6,338	4,888	1,947	3,894	5,841	2,444	4,888	7,332	1,222	60,072
Total	737,692	454,964	26,285	52,570	59,302	7,432	22,864	30,296	29,706	59,302	89,008	18,853	316,807
<u>Kaniksu National Forest</u>													
Proposed	906,523	327,253	22,972	45,944	30,216	14,818	30,836	45,654	15,108	30,216	45,324	8,154	228,121
Existing	200,685	95,005	12,991	24,657	0	12,991	24,657	37,648	0	0	0	0	57,357
Total	1,107,208	422,258	35,963	70,601	30,216	27,809	55,493	83,302	15,108	30,216	45,324	8,154	285,478
<u>Kootenai National Forest</u>													
Proposed	1,090,611	646,539	132,381	209,848	135,092	26,558	67,219	93,777	142,629	135,092	277,721	105,823	169,218
Existing	282,412	169,743	24,119	46,265	0	24,119	46,265	70,384	0	0	0	0	99,359
Total	1,373,023	816,282	156,500	256,113	135,092	50,677	113,484	164,161	142,629	135,092	277,721	105,823	268,577
<u>Lolo National Forest</u>													
Proposed	619,158	285,040	18,367	36,734	38,976	7,423	17,256	24,669	19,488	38,976	58,464	10,944	190,963
Existing	81,029	34,401	5,887	11,774	0	5,887	11,774	17,661	0	0	0	0	16,740
Total	700,187	319,441	24,254	48,508	38,976	13,310	29,030	42,330	19,488	38,976	58,464	10,944	207,703
<u>St. Joe National Forest</u>													
Proposed	1,241,149	386,922	99,092	165,390	102,820	5,399	31,002	36,401	134,388	102,820	237,208	93,693	19,620
Existing	384,404	134,113	34,343	58,119	29,304	19,272	33,977	53,249	24,142	29,304	53,446	15,071	12,347
Total	1,625,553	521,035	133,435	223,509	132,124	24,671	64,979	89,650	158,530	132,124	290,654	108,764	31,967
<u>REGION TOTAL:</u>													
Proposed	5,430,048	2,234,628	328,763	561,665	415,088	71,701	189,966	261,657	371,727	415,088	786,815	257,044	929,112
Existing	1,177,057	529,598	85,454	157,043	34,192	69,161	130,457	199,618	26,586	34,192	60,778	16,293	252,909
Total	6,607,105	2,764,226	414,217	718,708	449,280	140,862	320,423	461,275	398,313	449,280	847,593	273,337	1,182,021

(Thousand Board Feet - Scribner)

*High value watershed.

TABLE IX (Continued)

COORDINATED PLAN

LOGGING FOR CONTROL AND SALVAGE

SPRUCE BARK BEETLE CONTROL

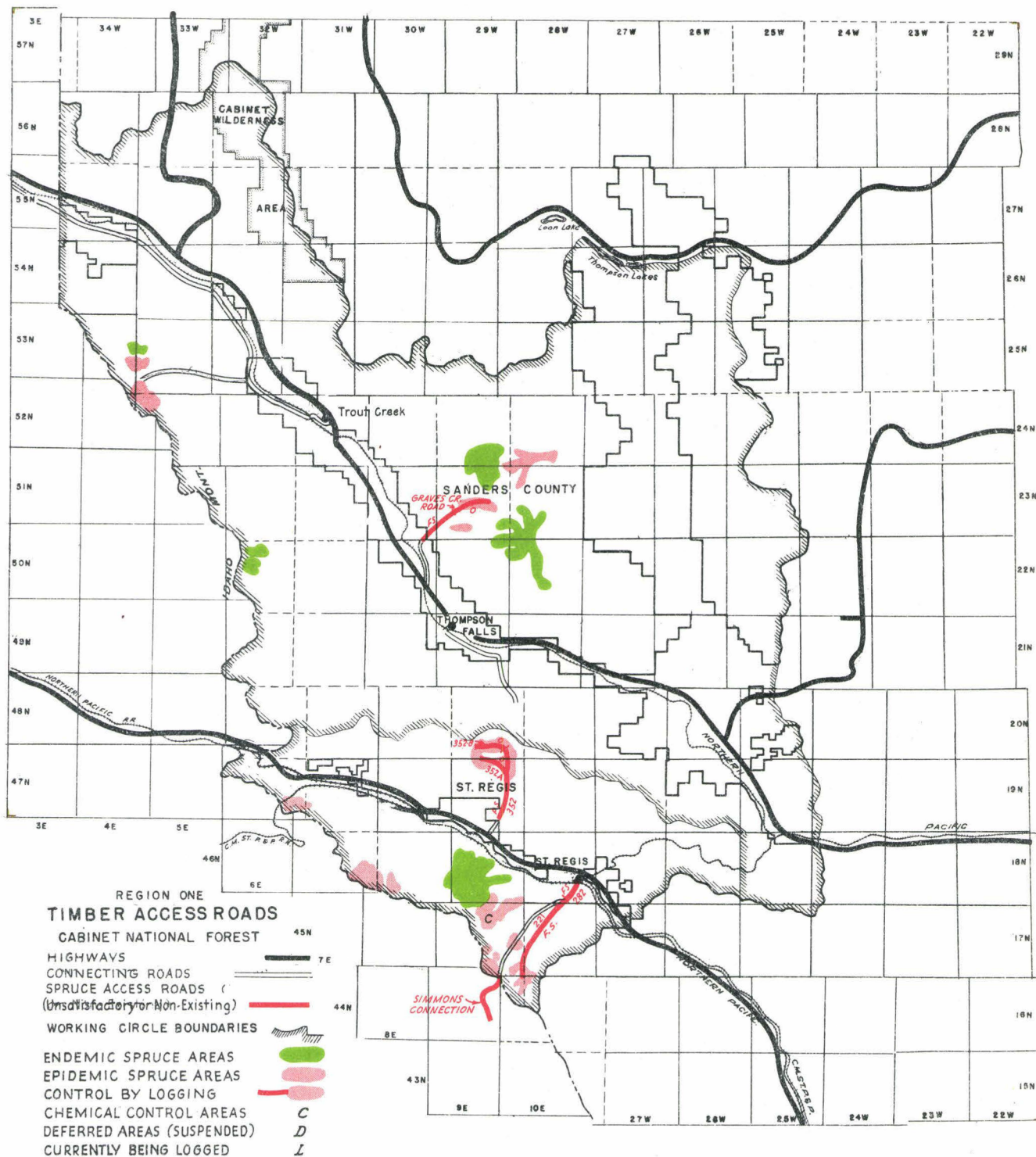
(Thousand Board Feet - Scribner)

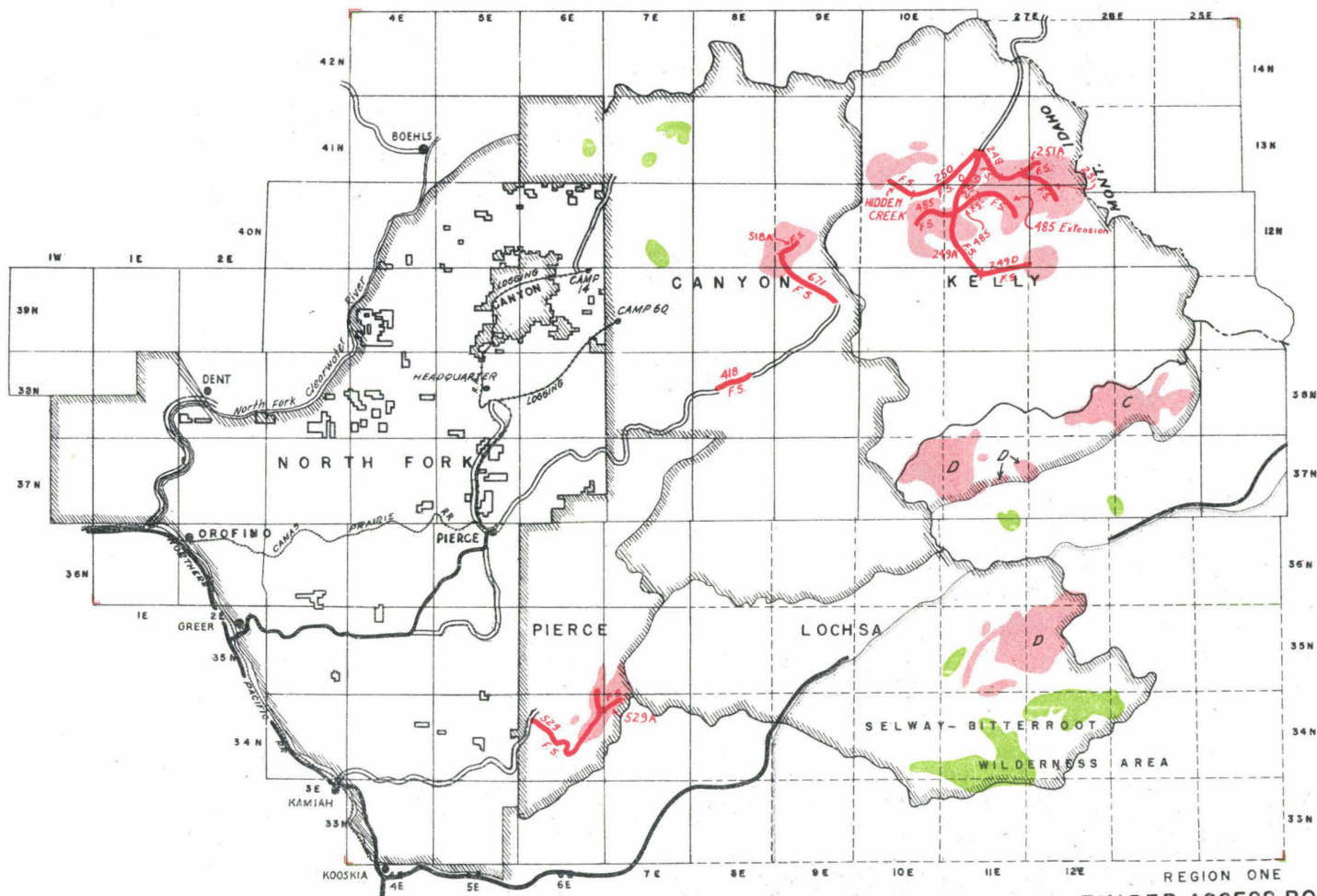
Forest and Working Circle	Road Number	Compartment Number	Total Volume		Infested Spruce Volume			Planned Spruce Production						Remaining Spruce Volume in 1955	
			All Species	Spruce	1952	1953	1954	1955			1956			Dead (15)	Green (16)
								Salvage	Infested	Total	Salvage	Infested	Total		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Kaniksu National Forest															
Priest River	233,333A)														
	659,659A)	331	8,885	1,610	193	386	0	193	386	579	0	0	0	0	1,031
	637,637A)	201,202													
	662,282)	204,205	149,061	27,506	3,034	6,068	12,136	0	0	0	6,068	12,136	18,204	3,034	6,268
	Existing	341	9,935	1,700	204	408	0	204	408	612	0	0	0	0	1,088
	Existing	353	7,885	894	36	72	0	36	72	108	0	0	0	0	786
Bonnors Ferry	Saddle Creek	505	47,962	17,009	580	1,160	2,320	0	0	0	1,160	2,320	3,480	580	12,949
	281	509	47,334	15,353	803	1,606	3,212	0	0	0	1,606	3,212	4,818	803	9,742
	432	516	140,531	36,919	1,484	2,968	5,936	0	0	0	2,968	5,936	8,904	1,484	26,531
	633	519	179,021	62,587	3,307	6,614	0	3,307	6,614	9,921	0	0	0	0	52,666
	272A	403	31,110	11,092	1,465	2,930	0	1,465	2,930	4,395	0	0	0	0	6,697
	Canuck	408	101,570	71,388	2,853	5,706	6,612	600	2,400	3,000	3,306	6,612	9,918	2,253	56,217
	Existing	419,420	50,833	27,603	792	1,584	0	792	1,584	2,376	0	0	0	0	25,227
	Existing	428	8,636	5,278	132	264	0	132	264	396	0	0	0	0	4,882
	Existing	521	71,060	34,055	3,363	6,726	0	3,363	6,726	10,089	0	0	0	0	23,956
	Existing	525	10,614	7,844	2,940	4,904	0	2,940	4,904	7,844	0	0	0	0	0
Sandpoint	231,231A	601,602	87,534	51,946	6,455	12,910	0	6,455	12,910	19,365	0	0	0	0	32,581
	419,419A)	634,635													
	419B)	639,640	113,515	31,843	2,798	5,596	0	2,798	5,596	8,394	0	0	0	0	23,449
	Existing	603,605	34,708	16,031	5,460	10,911	0	5,460	10,911	16,361	0	0	0	0	0
	Existing	702	3,325	337	14	28	0	14	28	42	0	0	0	0	295
	Existing	703	3,689	1,263	50	100	0	50	100	150	0	0	0	0	1,113
Pend Oreille			0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	Proposed		906,523	327,253	22,972	45,944	30,216	14,818	30,836	45,654	15,108	30,216	45,324	8,154	228,121
	Existing		200,685	95,005	12,991	24,657	0	12,991	24,657	37,648	0	0	0	0	57,357
	Total		1,107,208	422,258	35,963	70,601	30,216	27,809	55,493	83,302	15,108	30,216	45,324	8,154	285,478
Kootenai National Forest															
Fortine	114	120A)													
	01. Rich	1/2-123)	121,943	109,092	6,905	13,810	18,020	1,200	4,800	6,000	9,010	18,020	27,030	5,705	70,357
	Existing	1/2-123)													
	Existing	122,124	49,706	31,254	7,086	14,172	0	7,086	14,172	21,258	0	0	0	0	9,996
	Existing	130	4,969	2,964	622	1,244	0	622	1,244	1,866	0	0	0	0	1,098
Libby	303,92E	102	6,443	4,922	545	1,090	0	545	1,090	1,635	0	0	0	0	3,287
	337,751	97,99	70,718	48,944	8,253	16,506	0	8,253	16,506	24,759	0	0	0	0	24,185
	494	106	63,756	29,788	2,377	4,754	9,508	0	0	0	4,754	9,508	14,262	2,377	13,349
	Existing	95	39,860	18,329	2,566	5,132	0	2,566	5,132	7,698	0	0	0	0	10,631
	Existing	105	139,856	88,016	6,875	13,750	0	6,875	13,750	20,625	0	0	0	0	67,391
	Existing	101	19,921	13,987	2,130	4,260	0	2,130	4,260	6,390	0	0	0	0	7,597
Troy	176,472	30	43,815	37,893	24,288	13,605	0	0	0	13,605	0	0	13,605	24,288	0
	176,752	50	67,082	29,463	6,776	13,552	9,135	2,000	8,000	10,000	5,552	9,135	14,687	4,776	0
	339	23,24	94,044	62,783	22,733	40,050	0	1,000	4,000	5,000	36,050	0	36,050	21,733	0
	92H	26	32,571	20,117	11,049	9,068	0	600	2,400	3,000	6,668	0	6,668	10,449	0
	338,338A)	2,344													
	523)	5,20	238,303	153,979	18,463	36,926	61,052	1,600	6,400	8,000	30,526	61,052	91,578	16,863	37,538
	68	32,33	53,129	12,148	3,016	6,032	0	3,016	6,032	9,048	0	0	0	0	3,100
	470	34	7,162	5,157	2,218	2,939	0	2,218	2,939	5,157	0	0	0	0	0
	276,276A)														
	276B)	9,10	14,912	7,451	736	1,472	2,944	0	0	0	1,472	2,944	4,416	736	2,299
	757	8	15,840	1,783	446	892	445	0	0	0	892	445	1,337	446	0
	92D	14	55,837	9,058	1,673	3,346	4,039	0	0	0	3,346	4,039	7,385	1,673	0
	92(L)	22	7,105	3,340	835	1,670	0	835	1,670	2,505	0	0	0	0	835
	92(U)	15,16	11,112	10,145	1,811	3,622	4,712	0	0	0	3,622	4,712	8,334	1,811	0
	524,524A	25,27)													
	28)		89,634	54,797	13,381	26,762	14,654	1,400	5,600	7,000	21,162	14,654	35,816	11,981	0
	Arbo Mtn.	37	34,867	19,538	2,985	5,970	10,583	0	0	0	5,970	10,583	16,553	2,985	0
	384A	64	62,338	25,941	3,891	7,782	0	3,891	7,782	11,673	0	0	0	0	14,268
	Existing	29	18,331	10,584	2,646	5,292	0	2,646	5,292	7,938	0	0	0	0	2,646
	Existing	35	9,769	4,609	2,154	2,415	0	2,154	2,415	4,609	0	0	0	0	0
TOTAL	Proposed		1,090,611	646,539	132,381	269,848	135,092	26,558	67,219	93,777	142,629	135,092	277,721	105,823	169,216
	Existing		282,412	169,743	24,119	46,265	0	24,119	46,265	70,384	0	0	0	0	99,359
	Total		1,373,023	816,282	156,500	256,113	135,092	50,677	113,484	164,161	142,629	135,092	277,721	105,823	268,577

TABLE IX (Continued)
COORDINATED PLAN
LOGGING FOR CONTROL AND SALVAGE
SPRUCE BARK BEETLE CONTROL

(Thousand Board Feet - Scribner)

Forest and Working Circle	Road Number	Compartment Number	Total Volume		Infested Spruce Volume			Planned Spruce Production						Remaining Spruce Volume	
			All Species	Spruce	1952	1953	1954	1953			1954			In 1955	
								Salvage	Infested	Total	Salvage	Infested	Total	Dead	Green
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
<u>Lolo National Forest</u>															
<u>Superior-9 Mile</u>	320	4	20,738	11,636	1,551	3,102	0	1,551	3,102	4,653	0	0	0	0	6,963
	Existing	6	24,507	11,967	1,720	3,440	0	1,720	3,440	5,160	0	0	0	0	6,807
<u>Lolo</u>	461	1/2 77	11,247	7,328	2,007	4,014	0	2,007	4,014	6,021	0	0	0	0	1,307
	699	68	31,739	7,433	744	1,488	2,976	0	0	0	1,488	2,976	4,464	744	2,225
	Existing	1/2 77	11,247	7,328	2,008	4,016	0	2,008	4,016	6,024	0	0	0	0	1,304
<u>Seeley Lake</u>	552	29	20,434	9,643	565	1,130	0	565	1,130	1,695	0	0	0	0	7,948
	Existing	42	27,744	5,033	252	504	0	252	504	756	0	0	0	0	4,277
	Existing	25	10,482	7,658	1,786	3,572	0	1,786	3,572	5,358	0	0	0	0	2,300
<u>Powell</u>	245,369B	78,79,80	450,000	228,000	11,400	22,800	36,000	1,200	4,800	6,000	18,000	36,000	54,000	10,200	157,800
	Wendover)	83)													
	Badger Cr.)	84)	85,000	21,000	2,100	4,200	0	2,100	4,200	6,300	0	0	0	0	14,700
<u>North Fork</u>	Existing	47	7,049	2,415	121	242	0	121	242	363	0	0	0	0	2,052
<u>TOTAL</u>	Proposed		619,158	285,040	18,367	36,734	38,976	7,423	17,256	24,669	19,488	38,976	58,464	10,944	190,963
	Existing		81,029	34,401	5,887	11,774	0	5,887	11,774	17,661	0	0	0	0	16,740
	Total		700,187	319,441	24,254	48,508	38,976	13,310	29,030	42,330	19,488	38,976	58,464	10,944	207,703
<u>St. Joe National Forest</u>															
<u>Lower St. Joe</u>	216	82	40,561	30,915	20,711	10,204	0	0	10,204	10,204	0	0	0	20,711	0
	321,321B,510	84)													
	Cornwall-Hobo	85)	75,375	29,173	1,759	3,518	7,036	0	0	0	3,518	7,036	10,554	1,759	16,860
	Existing	77)													
	Existing	78)	48,752	12,667	5,600	7,067	0	5,600	7,067	12,667	0	0	0	0	0
	80	27,068	18,382	8,272	10,110	0	0	8,272	10,110	18,382	0	0	0	0	0
	339,339A	33,34	88,437	21,031	4,674	9,348	7,009	0	0	0	9,348	7,009	16,357	4,674	0
	218E	32	15,145	2,687	1,421	1,266	0	0	0	0	1,266	0	1,266	1,421	0
	218G	31	68,065	12,721	1,907	3,814	7,000	0	0	0	3,814	7,000	10,814	1,907	0
	383	30	99,415	19,103	2,376	4,752	9,504	0	0	0	4,752	9,504	14,256	2,376	2,471
	218	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	511,511A)	27)													
	Simmens	28)	62,242	21,853	5,771	11,542	4,540	1,000	4,000	5,000	7,542	4,540	12,082	4,771	0
<u>Sisters</u>	Upper Road &	7,8)													
	Spot. Louis	24,207)	272,933	72,802	20,483	40,966	11,353	1,000	4,000	5,000	36,996	11,353	48,319	19,483	0
	530A	1/4-3	12,246	1,486	399	798	0	399	798	1,197	0	0	0	0	289
	530,530B)	200,201)													
	530C,530D)	202,203)													
	787,761	204,205)	506,730	175,151	39,591	79,182	56,378	3,000	12,000	15,000	67,182	56,378	123,560	36,591	0
		206)													
	Existing	3/4 3	24,493	4,459	1,196	2,392	0	1,196	2,392	3,588	0	0	0	0	871
	Existing	5)													
	Existing	6)	227,598	83,517	18,071	36,142	29,304	3,000	12,000	15,000	24,142	29,304	53,446	15,071	0
<u>Little North Fork</u>	Existing	218	46,493	15,088	1,204	2,408	0	1,204	2,408	3,612	0	0	0	0	11,476
<u>TOTAL</u>	Proposed		1,241,149	386,922	99,092	165,390	102,820	5,399	31,002	36,401	134,388	102,820	237,208	93,693	19,620
	Existing		384,404	134,113	34,343	58,119	29,204	19,272	33,977	53,249	24,142	29,304	53,446	15,071	12,347
	Total		1,625,553	521,035	133,435	223,509	132,124	24,671	64,979	89,650	158,530	132,124	290,654	108,764	31,967

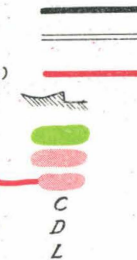




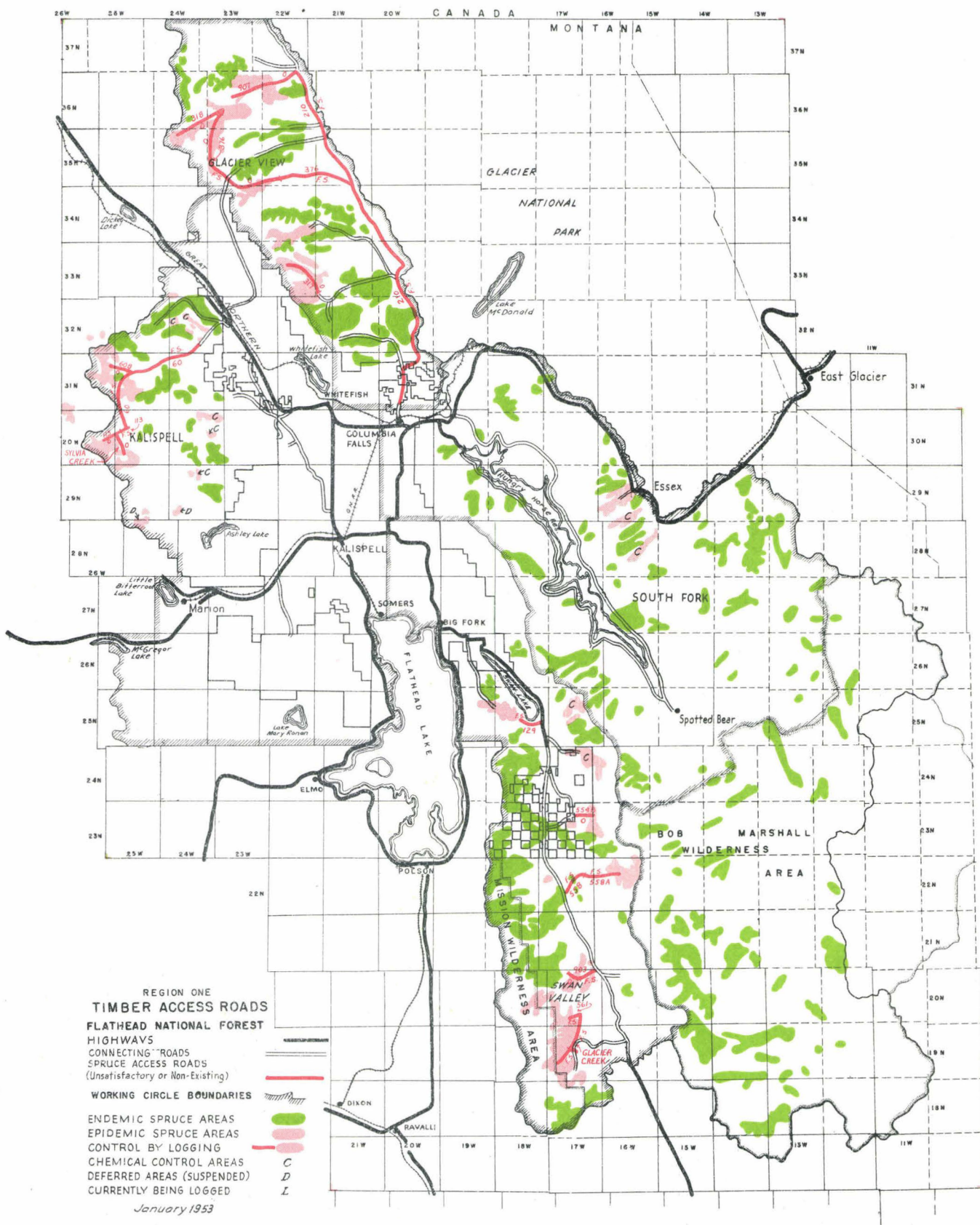
TIMBER ACCESS ROADS CLEARWATER NATIONAL FOREST

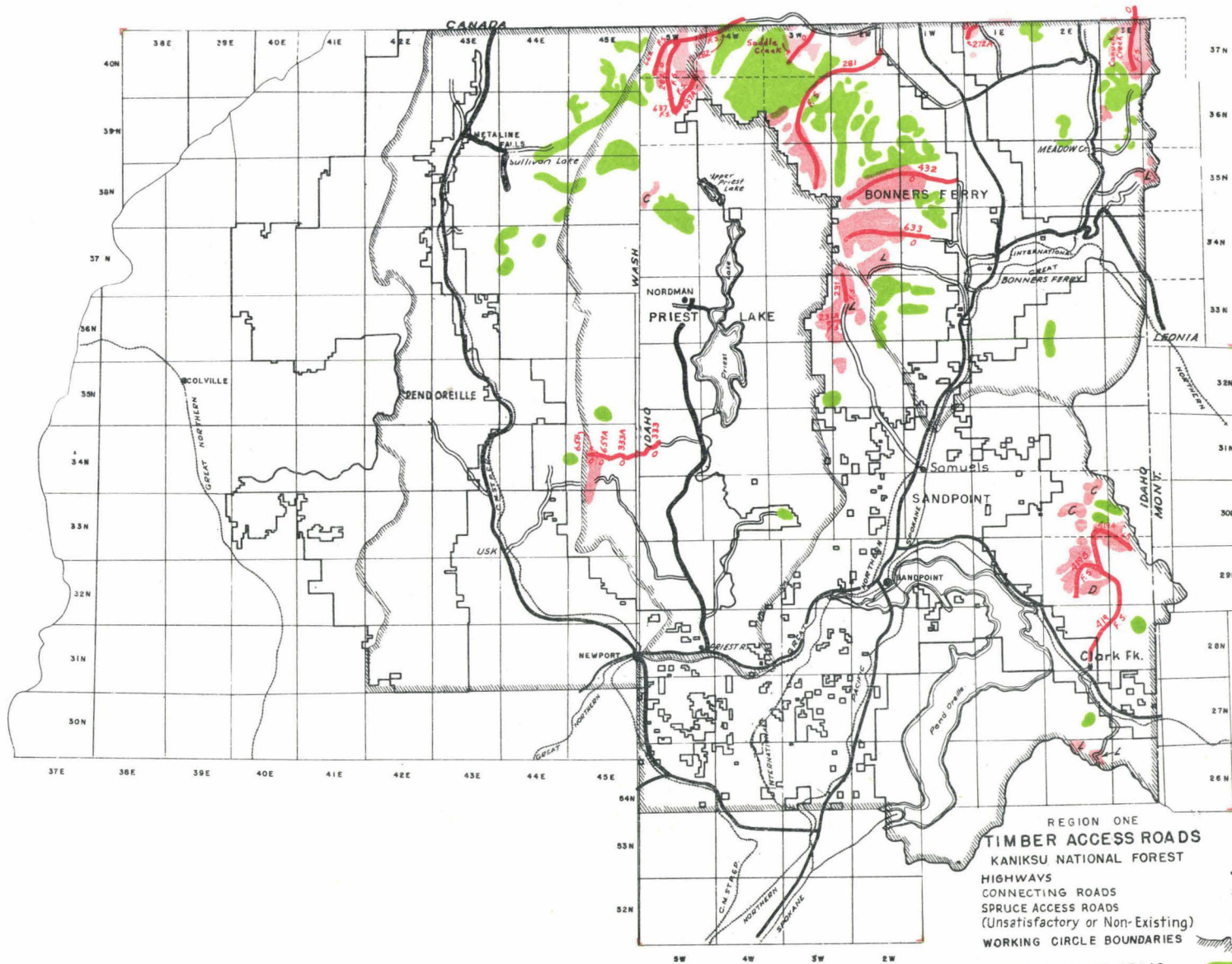
HIGHWAYS
CONNECTING ROADS
SPRUCE ACCESS ROADS
(Unsatisfactory or Non-Existing)
WORKING CIRCLE BOUNDARIES

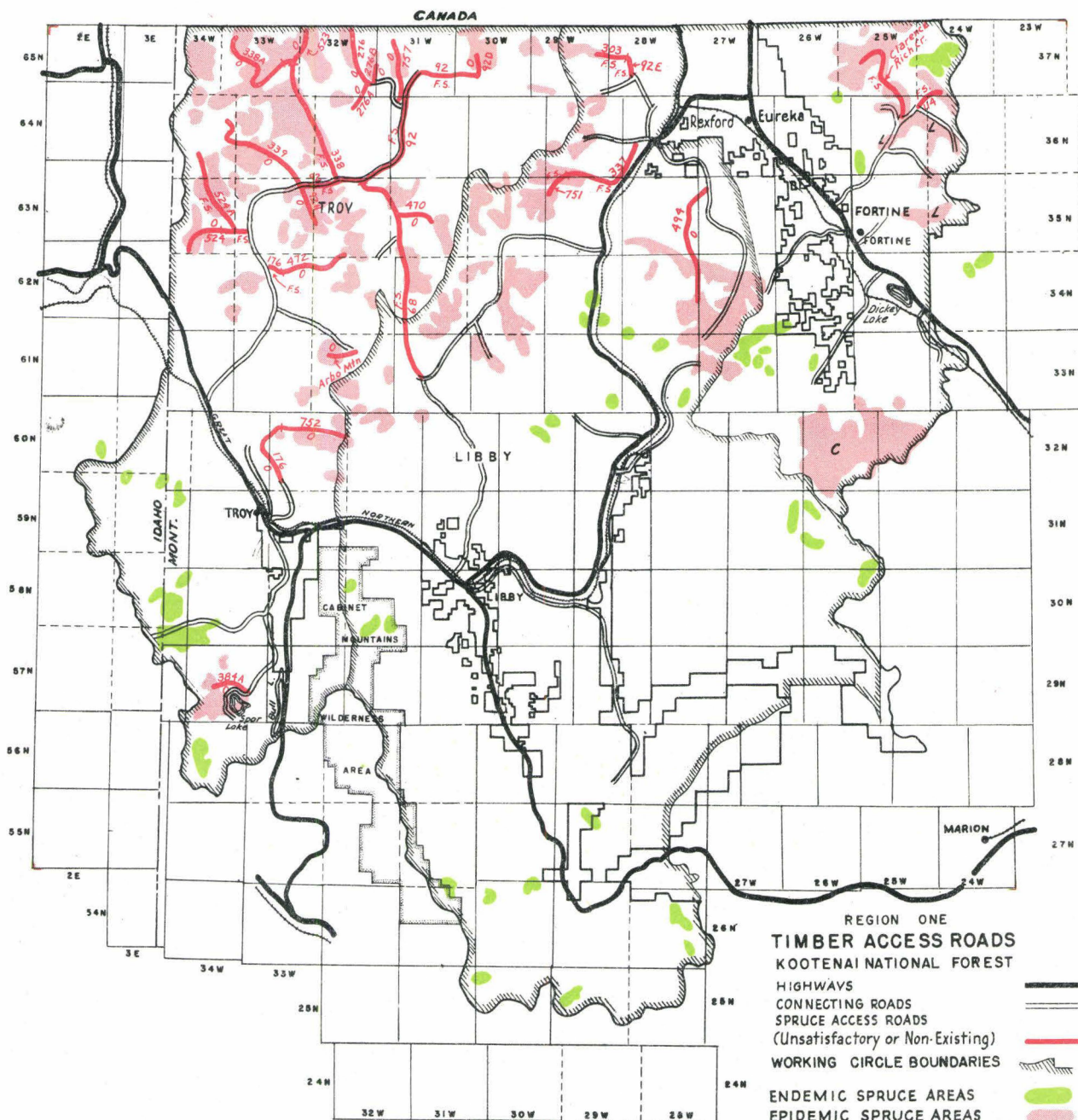
ENDEMIC SPRUCE AREAS
EPIDEMIC SPRUCE AREAS
CONTROL BY LOGGING
CHEMICAL CONTROL AREAS
DEFERRED AREAS (SUSPENDED)
CURRENTLY BEING LOGGED

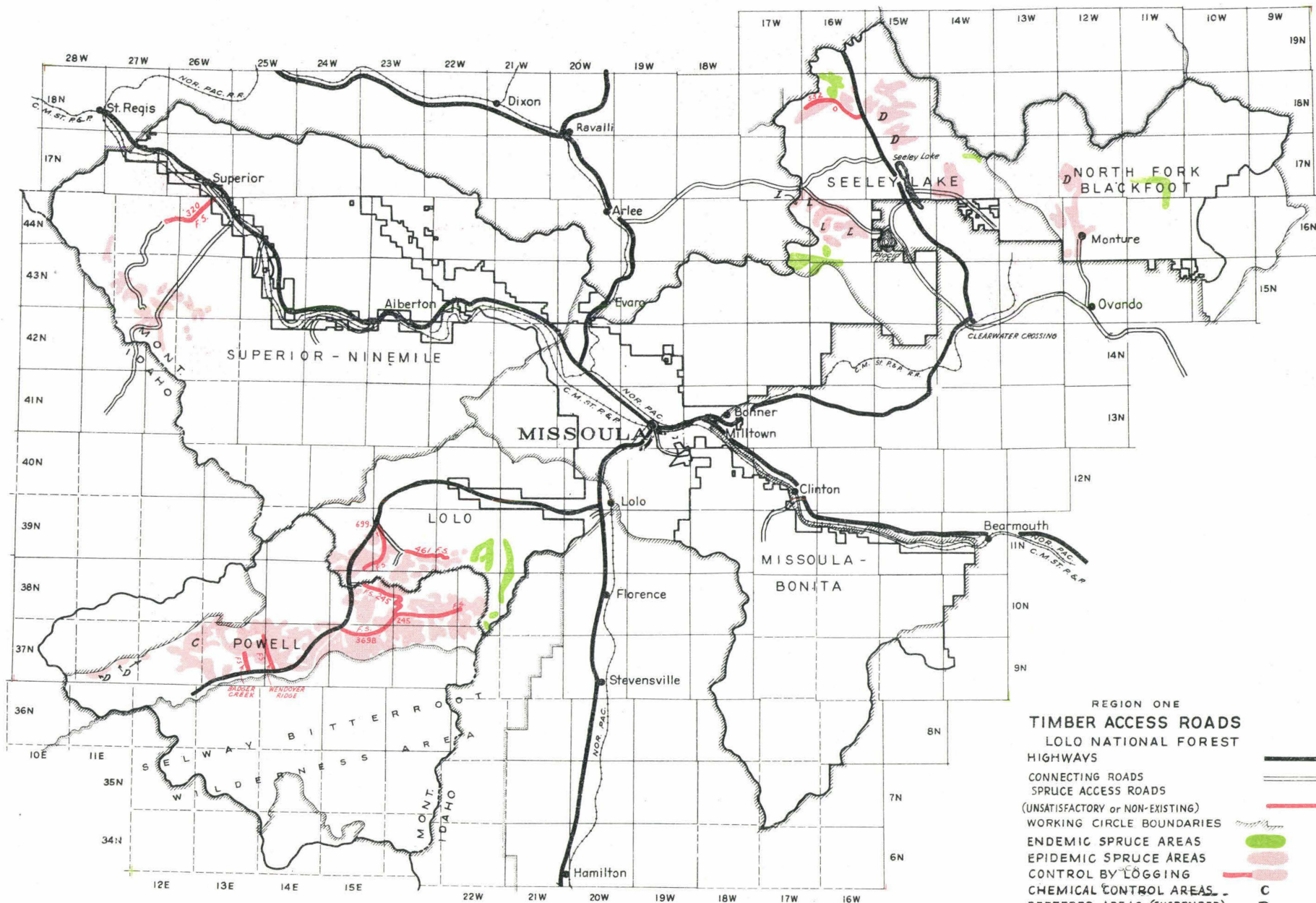


January 1953







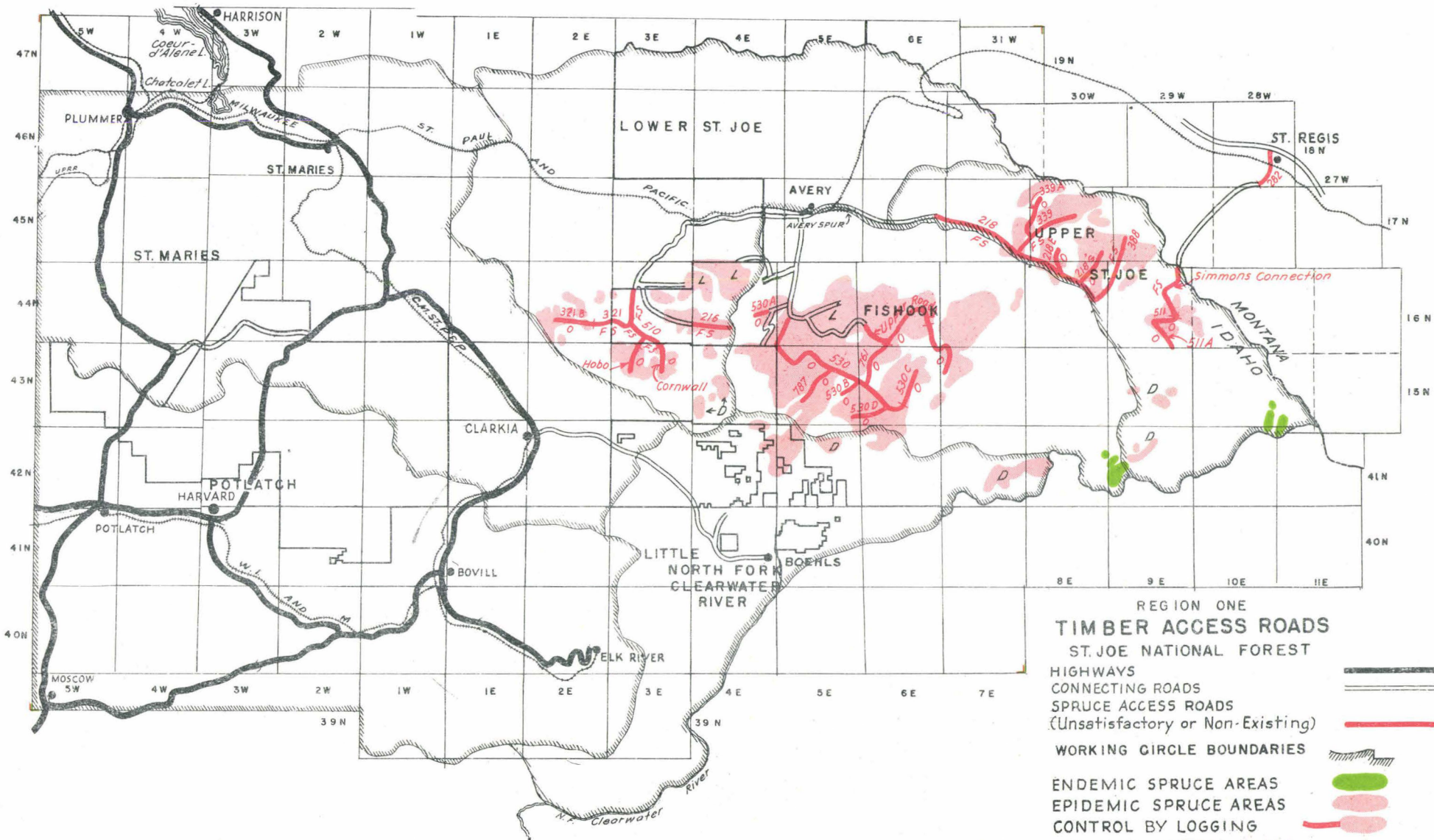


REGION ONE
TIMBER ACCESS ROADS
LOLO NATIONAL FOREST

- HIGHWAYS
CONNECTING ROADS
SPRUCE ACCESS ROADS
(UNSATISFACTORY or NON-EXISTING)
WORKING CIRCLE BOUNDARIES
ENDEMIC SPRUCE AREAS
EPIDEMIC SPRUCE AREAS
CONTROL BY LOGGING
CHEMICAL CONTROL AREAS
DEFERRED AREAS (SUSPENDED)
CURRENTLY BEING LOGGED



January 1953



CHEMICAL CONTROL

In planning the control of the epidemic first priority was given to control by logging. To apply chemical control, trees must be felled and only the most accessible can be utilized. In most instances control by logging is just as effective, cheaper, the treated spruce is put to commercial use and there are other important advantages. However, some infested spruce stands are not suitable for control by logging due to their extreme inaccessibility or small amount of volume. In such cases chemical control may be the only practical alternative.

Chemical control is recommended for small infested areas usually containing less than 3,000 treatable trees, where control by logging is not feasible. This type of control has been planned where a small amount of work will protect relatively large volumes of uninfested spruce on adjacent areas within the same entomological units.

The planning for chemical control summarized in Table X was based on control by entomological units. These units comprise large areas containing many spruce areas topographically close together. The individual spruce areas are so related one to another that control, or lack of it, in one or more areas may affect the spruce in the entire entomological unit. In some cases the chemical control supplements control by logging and the two methods are mutually dependent on each other. They comprise the total effort that is essential to save the largest practicable amount of spruce in an entomological unit.

For the areas where control is planned in the fall of 1953, examinations of the overwintering beetle population will be made in May or June. These examinations will provide evidence as to the severity of the 1953 infestation, however, a final decision as to the need for control within the areas listed in Table X will depend upon the results of surveys conducted during August. If, as a result of these early examinations, it is decided that control will be necessary, it will be desirable to construct the truck or jeep trails that are necessary for control during early June. This early construction would serve several purposes. It would provide for the moving of camp and control equipment and supplies well in advance of actual control operations. Truck or jeep trails into these back areas will facilitate the necessary survey program and the spotting of infested trees for subsequent chemical treatment.

In addition to these advantages, the freshly cut or newly "bull-dozed" spruce trees along the truck trail right-of-way will serve as attractive host material for 1953 attacks of the spruce beetle. It is hoped that this preferred host material will concentrate the 1953 infestation along the truck trail where subsequent treatment can be easily accomplished.

To bring about a satisfactory reduction of the infestation in some of the spruce areas logged in 1952, it will undoubtedly be necessary to treat with chemicals a few spots of infested trees that were missed or could not be removed during the 1952 season. An example of such an area is in Cliff Creek of the Keeler Creek Drainage of the Kootenai National Forest. Such direct control action is considered as being of greater value to the overall project, than to pick up these scattered trees and small areas of infested trees with logging equipment. Treating these trees with chemicals will release indispensable logging equipment for work in other areas of heavy infestation. This item is most important, as the success of the future logging program as a means of combatting the infestation, is to have all available road building and logging equipment directed to this objective.

It may also be necessary to treat some logs that are to be cut this winter from 1952 attacked trees, that cannot be removed from the woods during April and May. This necessity will occur in areas that are to be logged this winter while the logs can be transported over frozen roads. When this advantageous road condition no longer exists, it will be necessary to stock-pile logs in the woods for subsequent hauling later in the season. As this cannot be accomplished prior to the emergence of the beetles, it will be necessary to treat the piled logs to prevent the beetles from emerging and attacking other trees. The stock-piling and treatment of these logs during this nonhaul period is considered essential to the success of the remainder of the season's logging operation. When logging crews are laid off because of the shutdown during this season of the year, the temporary laborers, many of them with valuable skills, are soon scattered and can never be reassembled. Furthermore, much valuable equipment would be left in the woods for an indefinite period of idleness, when its maximum use is a most desirable factor.

To provide for these emergency situations during the spring of 1953, the sum of \$50,000 is recommended. Any portion of this sum that is spent at that time for truck trails to facilitate chemical control in the fall of 1953 will reduce the estimated cost of control by a proportionate amount.

To provide for similar situations during the fiscal year 1954 the sum of \$400,000 has been recommended. It is estimated that this amount of money will be needed to meet the type of emergencies described, that will exist with the greatly increased 1953 program, but which cannot be localized at this time. It is necessary to have ample means to protect the planned control effort by adequate attention to expected contingencies during 1953 and up to July 1, 1954.

An explanation of the chemical control projects in Table X follows:

Ward Creek

The reconnaissance data for the Two Mile portion of this compartment indicates an infestation of potentially serious proportions. The 14 percent infestation is considered dangerous. To the northwest lies a much larger endemic area with an additional 5,700 MBM of spruce which is in jeopardy. (See graph following Table X.) Other spruce stands to the south of the proposed control area on both the Cabinet and St. Joe National Forests are in this infestation unit. These areas are to be logged for control in 1953 and 1954. To safeguard the benefits derived from logging and to preserve the residual spruce stands, this relatively inaccessible area is proposed for chemical control.

Miller Creek

This compartment is a part of a well defined entomological unit. The major part of this infestation in Miller Creek will be controlled by logging. It appears that a small area in the upper portion of this drainage cannot be logged in 1953. As any amount of infestation in this unlogged spruce stand could jeopardize the beneficial results obtained from logging in both Martin and Miller Compartments, it is desirable that all untreated portions of this unit be treated. This group of compartments, with those adjacent on the Kootenai Forest should carry a fair degree of protection from other areas.

Reid Unit

This is a small infestation unit composed of scattered spruce areas. Some logging on existing roads may be possible, but, due to relatively small infested timber volumes, chemical control is more feasible. Control costs will be more than compensated for by the protection of additional spruce stands to the west of these isolated areas.

Bond Creek

Data are adequate for this area which contains a rather large volume of spruce. The 1952 infestation indicates an entomological need for a control program. Logging is not considered feasible in 1953 or even 1954. However, the area is relatively accessible for chemical control and weather conditions should permit the proposed project to be completed by June 15.

Available information on adjacent spruce areas do not indicate more than normal bark beetle numbers, thus a relatively large volume of green spruce may be protected with a small expenditure of funds. Appraisal survey data for another compartment which is still farther south but in this infestation unit shows an endemic infestation of 1 percent.

(In the graph following Table X, the green spruce indicated as saved by chemical control is the remaining green spruce in Bond Creek and in the drainage immediately to the north.)

Dirtyface Unit

This group of spruce areas which comprise a definite infestation unit contains a large volume of spruce. Although the available data is not complete, reconnaissance surveys indicate an above normal bark beetle population in two compartments. Detection surveys in other compartments show the need for additional appraisal surveys, as this large volume of spruce does justify full consideration of all possible measures that would afford protection.

This group of units is in a steep, rough portion of the region. However, the existing road in Essex Creek will permit control by logging in 1953 in that part of the unit.

A chemical control expenditure of \$75,600 plus control by logging is expected to protect spruce volumes with a stumpage value of over \$600,000.

South Lost Creek

This area is considered as being rather well isolated from the other stands of infested spruce. An appraisal survey of the closest area to the north showed only a normal infestation. The character of the infestation within this compartment and the large volume of spruce involved indicates an entomological need for control. Survey data indicates a grouped infestation which can be controlled by spraying. Control by logging in 1953 does not seem possible.

Boulder Creek

This rather well isolated compartment contains a relatively large volume of spruce with a potentially dangerous but light infestation. Adjacent areas of spruce do not carry infestations above 2 percent which is considered as a normal infestation.

Chemical control in the fall of 1953 should save 91 percent of the total spruce volume of the compartment. (See graph following Table X.)

Lunch-Quartz Creek

These two compartments on the Kaniksu National Forest are a part of the Lightning Creek Drainage. Low saddles connect spruce areas in this drainage with spruce areas on the Kootenai National Forest. These areas may be considered an entomological unit.

Local forest officers have stated that chemical control is possible before June 15 and should be considered because of the high cost of constructing a logging road up Lightning Creek into this area.

Fortine Basin

This is a relatively large timbered compartment. Most of the spruce timber lies along the creek bottom, with a road through the main drainage and most of the infested timber. This compartment carries a large volume of spruce with a light but potentially dangerous spruce beetle infestation. The infestation within the areas to the south of this compartment are not considered as serious. The Fortine Compartment is part of an infestation unit which includes areas on both the Kootenai and Flathead National Forests. Martin Compartment on the Flathead is adjacent to Fortine Basin and Upper Sunday Creek on the Kootenai. All areas in this infestation unit are included in plans for direct chemical control or logging. It is possible that the infested trees within the Fortine Basin area will be sold this winter and the logs removed over frozen roads.

Upper Sunday Creek

This large area of spruce is a part of the infestation unit that lies on both the Kootenai and Flathead National Forests. The infestation in this compartment is similar to that of the Fortine Basin with a light but potentially dangerous infestation threatening a large volume of spruce. The present knowledge of the infestation within this compartment, as well as within all adjacent areas, makes the conduct of direct control in the fall of 1953 a sound entomological action.

Powell Working Circle

The Powell Working Circle is a large timbered area covering the southern portion of the Lolo National Forest in Idaho. In this area there is an estimated volume of over 600 MBM of spruce. In part of the working circle alternate sections are owned by the Northern Pacific Land Company.

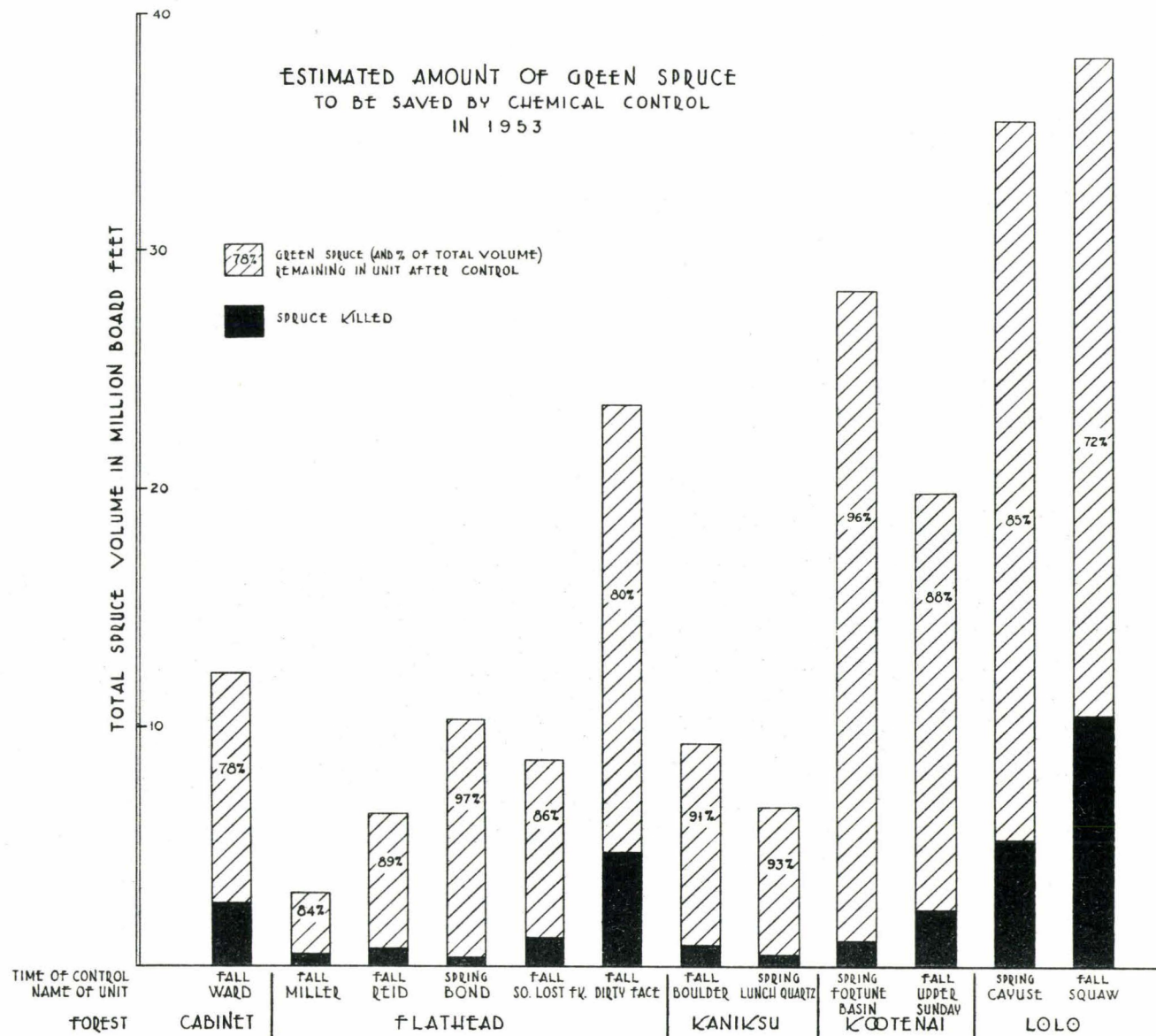
Surveys of the past season show some heavily infested areas in the western portion of this area. These surveys also indicate that there is only a light infestation in the eastern portion that would perhaps be considered as a normal condition. At the western limits of this lightly infested area, which could be identified as the Powell - Cayuse Junction Road, there are some known spots of heavy infestation. The proposal to treat these infestations to prevent the spread of the beetles to the east has considerable merit. However, the data that are available for this area are not adequate to permit this action to be recommended at this time.

To establish the entomological soundness of this barrier plan of control, it is necessary that a great deal more data as to the status of the infestation within specific areas be obtained. It is proposed that these data be obtained by surveys conducted during March when snow shoe travel is at its best. This survey will be made with personnel of the Lolo National Forest under the direct supervision of the Bureau of Entomology and Plant Quarantine, who will prepare a plan of operation.

When the survey of this area is completed, the data that are obtained will be used to determine the entomological soundness of attempting to protect this body of spruce by direct control in the spring of 1953.

TABLE X
CHEMICAL CONTROL

Forest & Compartment	No.	Total Spruce Volume in Compartment	% Inf.	1952 Inf. Spruce Volume	No. of Inf. Stems 1952 Brood No.	1953 Brood No.	Forest Pest Control Rds. Needed Miles	Road Cost Dollars	Spraying Cost Dollars	Total Cost F.Y. 1953 Spring Control Dollars	Total Cost F.Y. 1954 Fall Control Dollars
<u>Cabinet</u>				<u>MBM</u>	<u>No.</u>	<u>No.</u>					
Ward Creek	40	6,452	14	872		2,900	2	6,000	87,000		93,000
<u>Flathead</u>											
Miller Cr.	206	1,973	8	160		640	2	6,000	19,200		25,200
Reid Unit	222,223, 226	3,374	7	236		920	4	12,000	27,600		39,600
Bond Cr.	422	4,776	6	312	1,740		2	6,000	52,200	58,200	
Dirtyface Unit	370,372	23,498	7	1,564		2,520			75,600		75,600
So. Lost Cr.	440	8,605	5	401		1,600	3	9,000	48,000		57,000
<u>Kaniksu</u>											
Boulder	212	9,300	8	293		680	2	6,000	20,400		26,400
Quartz	629	3,945	8	312	360)					
Lunch	632	2,628	5	151	180)	7	21,000	16,200	37,200	
<u>Kootenai</u>											
Fortine	136	28,295	4	1,122	1,370		3	9,000	41,100	50,100	
Upper Sunday	138	19,805	4	773		1,880	3	9,000	56,400		65,400
<u>Lolo</u>											
Cayuse Cr. Unit	21	35,352	8	5,280	5,280					158,400	
Squaw Cr. Unit		38,110	9	3,500		7,000					210,000
<u>Region</u>											
Spur road & spraying scattered areas adj. to logging areas.										50,000	400,000
<u>TOTALS</u>		186,113		14,976	8,930	18,140	28	84,000	443,700	353,900	992,200



C. PLANS FOR SURVEYS, COMPARTMENT ANALYSIS, PROJECT TECHNICAL SERVICES; SALE PREPARATION AND OTHER ITEMS

Surveys

Detailed plans for spruce bark beetle damage surveys in 1953 will be made as soon as the complete program has been determined. The amount of control by logging and chemical control actually scheduled for 1953 and 1954 will largely determine the survey program. Where the action for 1953 rests upon data that are not considered fully adequate, appraisal surveys will be required in early spring. There will also be a need to determine how the beetles have wintered, beginning in March, 1953. However, the major portion of the survey program will be designed to determine the status of the 1953 infestation.

On the basis of the proposed action program, officers of the Bureau have estimated that to meet the full requirements of such a work load, \$40,000 will be required in 1953 and \$80,000 required in 1954.

This is an estimate only which will be subject to revision when final action plans are settled. The estimated funds are for the actual surveys, which will be made by the Bureau of Entomology and Plant Quarantine, and does not include other costs associated with the forest compartment analysis now being made.

The Forest Service estimates that it will require an additional \$20,000 for compartment analysis and project technical services in fiscal year 1953 and \$40,000 additional in fiscal year 1954. This makes totals of \$60,000 and \$120,000 for these purposes for fiscal years 1953 and 1954, respectively.

Sale Preparation

Funds will be needed for the preparation and administration of spruce sales for control and salvage. Otherwise, their preparation and administration would place an unsupportable burden on regular sale funds and drain them away from essential sales of other timber. Preparation and administration of sales of infested spruce will be interwoven with beetle control. For various reasons the sales of infested spruce will cost more per thousand than other sales and this extra cost should be adequately financed.

The planned production of infested and salvage spruce for 1953 is 461 million board feet. Based on Table III, approximately 85 percent, or 392 million, will be national forest spruce. In 1952 the region cut approximately 553 million of all species and

and products. The seven forests in the emergency spruce program cut 329 million of this, leaving 224 million cut on the other 10 forests. If we assume that the cut on the other 10 forests cannot be materially changed due to existing sale contracts and commitments, they may cut approximately 224 million in 1953. If it is assumed that the seven national forests must cut some 150 million of species other than spruce, the total cut of such species may be 374 million. If we add to that the 392 million of spruce based on the 1953 production goal, the total cut may be in the neighborhood of 766 million. (Probably it will tend to be more rather than less.) If the region is financed timber use costs for 625 million in 1953, the additional 141 million will need to be financed by some means. At \$1.46 per M (this is the average timber use cost on the white pine forests for fiscal years 1949, 1950 and 1951) it will cost \$205,860 to pay for the timber use costs for the additional 141 million.

There is also the extra timber use cost for 392 million of infested spruce to be taken care of. It is estimated that this extra cost will average at least 30 cents per M. On this basis the extra cost will be \$117,600. This cost should be borne by pest control funds because it will be needed on account of special work to control the infestation, such as special surveys, appraisals, marking, remarking and checking to make certain that the right trees are cut at the right time. Light cuts will be made in many cases that will add to the cost.

Payment to Operators to remove infested spruce having minus stumpage value is, of course, a nebulous item to estimate at this time. Study of the quantities of spruce logged in 1952 as shown in Table VI; the amount of spruce programmed for logging in 1953 and 1954 as in Table VII, and study of the distance to be hauled as shown by the road maps as well as the large amounts of capital operators will be required to tie up in secondary roads, spur roads and extensions of main roads not included with the programmed roads, leads to the conclusion that it will be essential to move a considerable amount of spruce that may have a minus stumpage value. It is, therefore, important to get funds for this purpose into the picture early. It is estimated that \$500,000 might be required for this purpose in fiscal year 1954 for the logging season of 1953. This was based on 50 million at an average of \$10 per M. The cost per M would vary greatly based on the appraisal of each case. Even an average cost of \$10 per M is much less than the cost of chemical control, which may average \$40 per M.

Unless we are able to expedite the logging of infested spruce in this manner we would probably be forced to attempt to achieve the same objective by making larger and larger long-term sales; involving larger volumes of species other than spruce. This would be undesirable for a number of reasons, the chief objection being that the productive effort and working capital of local industry would be dissipated without obtaining the desired removal of infested spruce.

This form of subsidy to obtain maximum removal of infested spruce can be carried only to the point where the market will absorb the product. It might even tend to depress the market unless it is supplemented by some form of market support.

Protect and Expand the Market for Spruce

Although funds are not required for this purpose at the moment, it is important to keep it in the foreground for further consideration. The psychological effect of the existence of a program to protect and expand the market might have an important strengthening effect upon the market for spruce lumber. Much of the spruce cut in 1952 will not reach the lumber market until 1953. By that time more spruce logs will be rolling out of the woods. The sum total of windthrown, infested and uninfested spruce logged in 1953 may be several times that cut in 1952. This may put a breaking strain on the market. Plans should be made well in advance to cope with such a situation.

D. TABLE XI. SUMMARY OF ESTIMATED NEEDS
AND PROBABLE SOURCE OF MONEY TO FINANCE
RECOMMENDED PROGRAM
FISCAL YEARS 1953 and 1954

Items	Probable Source of Funds	Amount
1. Chemical control	Fiscal Year 1953 Pest Control Fund W.O. Contingent Fiscal Year 1954 Pest Control Fund	\$ 353,900 992,200
2. Sales preparation	Fiscal Year 1954 P&M (030) Fiscal Year 1954 Pest Control Fund	205,860 117,600
3. Insect surveys	Fiscal Year 1953 Pest Control Fund W.O. Contingent Fiscal Year 1954 Pest Control Fund	40,000 80,000
4. Compartment analysis and project technical services	Fiscal Year 1953 Pest Control Fund W.O. Contingent Fiscal Year 1954 Pest Control Fund	20,000 40,000
5. Payment to operators to remove spruce with minus stumpage value	Fiscal Year 1954 Pest Control Fund	500,000
6. Main haul roads	Supplemental FRD appropriation for Fiscal Year 1953 Subtotal F.Y. 1953 Subtotal F.Y. 1954 Total	<u>9,943,500</u> \$10,357,400 1,935,660 \$12,293,060
7. Main haul roads	Operator constructed 1953 and 1954 Program Total	\$ 5,657,000 \$17,950,060